

SPAWAR
Systems Center
San Diego

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March 2005

SSC San Diego
Command History
Calendar Year 2004

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SSC San Diego
San Diego, CA 92152-5001

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SSC SAN DIEGO
San Diego, California 92152-5001

T. V. Flynn, CAPT, USN
Commanding Officer

R. F. Smith
Executive Director

ADMINISTRATIVE INFORMATION

This technical document was prepared in response to OPNAVINST 5720.12H. The document summarizes the major activities and achievements of Space and Naval Warfare Systems Center San Diego (SSC San Diego) in Calendar Year 2004. This document was prepared by the Technical Knowledge Management Division using in-house funding.

Released under authority of
Tom LaPuzza
Public Affairs Officer

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PREFACE

The Space and Naval Warfare Systems Center San Diego (SSC San Diego), Command History for calendar year (CY) 2004 is submitted in conformance with OPNAVINST 5750.12H. The history provides a permanent record of CY 2004 activities at SSC San Diego. Although the history covers one calendar year, much of the information was only available on a fiscal year (FY) basis and is so noted in the text. In addition, some CY 2003 accomplishments were received too late for inclusion in the CY 2003 history and are included here; these are noted in the text.

This Command History is divided into three main sections. The first section is a general introduction to SSC San Diego. The second section describes administrative highlights. The third section documents technical highlights.

Appendices to this document provide supplementary SSC San Diego information. Appendix A lists achievement awards given in CY 2004. Appendix B lists patents awarded in CY 2004. Appendices C and D provide lists of distinguished visitors hosted by SSC San Diego and major conferences and meetings at SSC San Diego, respectively. Appendix E lists acronyms used in the document.

CONTENTS

SECTION 1 INTRODUCTION	1
INTRODUCTION TO SSC SAN DIEGO	2
Mission	2
Leadership and Technology Areas	2
Assigned Leadership Areas	2
Technology Areas	2
Vision	3
Programs	3
Organization	3
SECTION 2 ADMINISTRATIVE HIGHLIGHTS	5
FUNDING	6
PERSONNEL	7
Personnel OnBoard	7
Major Personnel Changes	7
SPAWAR Alignment	9
National Security Personnel System (NSPS)	9
Organizational Survey	9
Base Closure and Realignment (BRAC) Commission	10
New Professional (NP) Program	10
STRATEGIC PLANNING AND INITIATIVES	11
SSC San Diego Strategic Plan	11
Joint Process Action Team (PAT)	11
Project Management Council (PMC)	11
COMMUNITY OUTREACH	13
FIRST Robotics	13
Mesa Shadow Day	13
High Tech High Internship Program	13
Robotic Submarine Competition	13
Naval Research Enterprise Intern Program (NREIP)	14
Technology Match Days	14
SECTION 3 TECHNICAL HIGHLIGHTS	15
NAVIGATION AND APPLIED SCIENCES	16
Homeland Security-Related Technologies	16
Joint Interagency Task Force-South (JIATF-South)	16
Marine Air Traffic Control and Landing Systems (MATCALs)	16
Green Abalone Trial Test Plant	17

Networked-Integrated Remotely Operated Weapon System (NROWS)	17
COMMAND AND CONTROL	19
Homeland Security-Related Technologies	19
Ground Midcourse Defense (GMD)	19
Aegis BMD Project Office	19
Composeable FORCEnet Human-Systems Integration (CFn-HSI) Laboratory	20
Global Command and Control Systems-Maritime (GCCS-M)	20
GCCS-M 4.x architecture	20
Information Warfare Combat Assessment Tool (IWCAT)	21
Über Chat	21
Web-Based Scheduling (WebSked)	22
Usability and Engineering Research (USER) Laboratory	22
Urban Resolve	22
Enhanced Naval Wargaming Simulation (ENWGS)	23
FLEET ENGINEERING	24
Consolidated Production Facility (CPF)	24
Joint Warrior Interoperability Demonstration (JWID) 04	24
United States Pacific Command (USPACOM) HQ21	24
USS <i>Blue Ridge</i> (LCC 19) Modernization	25
Ground Midcourse Defense	25
SSP <i>Kaimalino</i>	25
INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE	26
Fiber Optic Micro Cable (FOMC)	26
High Performance Computing Resources	26
COMMUNICATIONS AND INFORMATION SYSTEMS	27
Subnet Relay	27
Joint Tactical Radio System Technology (JTRS) Laboratory (JTel)	27
Global Positioning System (GPS) Airborne Pseudolites Experiments (GPX)	27
Ground Midcourse Defense	27
APPENDIX A: CY 2004 ACHIEVEMENT AWARDS	28
Presidential Awards	28
Navy Awards	28
External/Industry Recognition	32
Center Civilian Awards	33
Center Career Service Awards	36
APPENDIX B: CY 2004 PATENT AWARDS	37
APPENDIX C: CY 2004 DISTINGUISHED VISITORS	39

APPENDIX D: CY 2004 MAJOR CONFERENCES AND MEETINGS48

APPENDIX E: ACRONYMS.....51

FIGURES

1. SSC San Diego organization3

TABLES

1. Funding by sponsor, FY 20046

2. Personnel onboard, FY 20047

SECTION 1

INTRODUCTION

INTRODUCTION TO SSC SAN DIEGO

The Space and Naval Warfare Systems Center San Diego (SSC San Diego), is a full-spectrum research, development, test and evaluation, engineering and fleet support center serving the U.S. Navy, Marine Corps, and other Department of Defense (DoD) and national sponsors within its mission, leadership assignments, and prescribed functions. SSC San Diego reports directly to the Commander, Space and Naval Warfare Systems Command (SPAWAR).

MISSION

SSC San Diego's formal mission is "to be the Navy's full-spectrum research, development, test and evaluation, engineering and fleet support center for command, control and communication systems and ocean surveillance and the integration of those systems which overarch multiplatforms."

LEADERSHIP AND TECHNOLOGY AREAS

Consistent with its mission, eight leadership areas are formally assigned to SSC San Diego. These leadership areas represent SSC San Diego's command, control, communications, computers, intelligence, surveillance, and reconnaissance (C⁴ISR) charter and its leadership areas outside that scope—ocean engineering and marine mammals. Beyond these areas, SSC San Diego has demonstrated national and international expertise in a broad range of technology areas.

ASSIGNED LEADERSHIP AREAS

- Command, control, and communication (C³) systems
- Command, control, and communication systems countermeasures
- Ocean surveillance systems
- Command, control, and communication modeling and analysis
- Ocean engineering
- Navigation systems and techniques
- Marine mammals
- Integration of space communication and surveillance systems

TECHNOLOGY AREAS

- Ocean and littoral surveillance
- Microelectronics
- Communications and networking
- Topside design/antennas
- Command systems
- Computer technology
- Navigation and aircraft C³
- Intelligence/surveillance/reconnaissance sensors
- Atmospheric effects assessment
- Marine mammals
- Environmental quality technology/assessment
- Robotics

VISION

SSC San Diego's vision is "to be the nation's pre-eminent provider of integrated C⁴ISR solutions for warrior information dominance." SSC San Diego's vision guides the Center's efforts in defining, developing, integrating, installing, and sustaining C⁴ISR systems.

PROGRAMS

SSC San Diego conducts a broad range of programs that focus on integrated C⁴ISR. The Center also conducts several unique programs outside its primary C⁴ISR focus: Environmental Quality Technology/Assessment, Marine Resources, Marine Mammals, Ocean Engineering, and Robotics and Physical Security. Innovative research is encouraged through the In-House Laboratory Independent Research and Independent Applied Research programs.

ORGANIZATION

Figure 1 shows SSC San Diego's organization as of 31 December 2004.

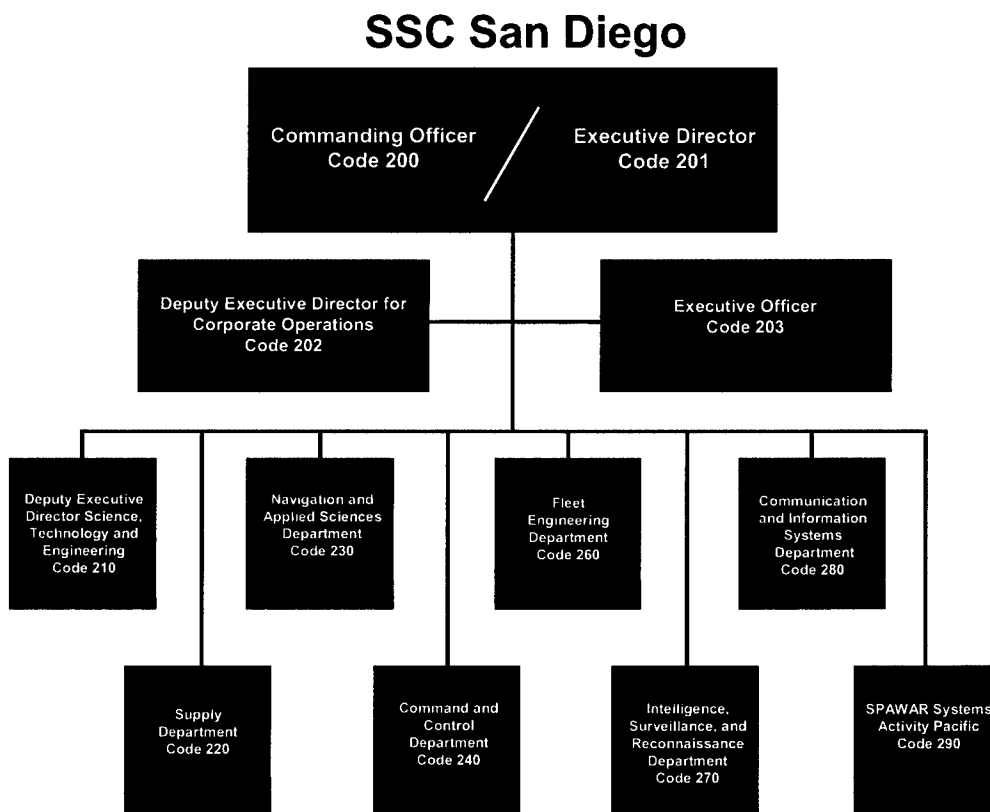


Figure 1. SSC San Diego organization.

SECTION 2 ADMINISTRATIVE HIGHLIGHTS

FUNDING

- Table 1 shows funding by sponsor in FY 2004.

Table 1. Funding by sponsor, FY 2004.

Sponsor	\$M (% of Total)
Space and Naval Warfare Systems Center	475 (34)
Defense Advanced Research Projects Agency	186 (13)
Other Navy	228 (17)
Other	255 (18)
Office of Naval Research	76 (6)
Naval Air Systems Command	90 (7)
Naval Sea Systems Command	74 (5)
Total	1.384B

PERSONNEL

PERSONNEL ONBOARD

Total personnel onboard for FY 2004 was 3676. Table 2 lists number of personnel by area.

Table 2. Personnel onboard, FY 2004.

Scientists and Engineers	1941
Technicians	400
Technical Specialists	574
Administrative	412
Clerical	248
Senior Executive Service	5
Ungraded/Other	24
Officers	43
Enlisted	29
Total	3676

MAJOR PERSONNEL CHANGES

SSC San Diego Executive Officer¹

SSC San Diego Executive Officer Capt. Patricia Miller detached from the Center on 29 July 2004. She transferred to Office of the Chief of Naval Operations, Arlington, Virginia, as Head Joint and Contingency Matters Branch/N1 Planner.

Capt. John Barron assumed responsibility as temporary Executive Officer/Department Head while the Center awaited the arrival of Capt. Miller's official relief, Capt. (Select) Carl Wallstedt.

SSC San Diego Comptroller²

Dave Bly was named SSC San Diego's new Comptroller, replacing Bob Frye, who retired in July. As the principal advisor to the Commanding Officer and the Executive Director on financial matters, the Comptroller ensures Department of Navy and DoD policies and procedures are followed.

Executive Director for Corporate Operations

Steve Arkin retired from government service after 36 years. From 2000 until his retirement, Arkin was the Center's Deputy Executive Director for Corporate Operations. John Chevrier became the Director of Corporate Operations in July, replacing Arkin as the department head.

As the Center's Deputy Executive Director for Corporate Operations, Arkin managed human resources policy and execution, new professional recruitment, awards, and training. He was also responsible for Working Capital Fund business; budgeting and financial operations for the Center; and development and implementation of the Navy's first full Enterprise Resource Planning (ERP) system, Project Cabrillo. He

met the challenge of several Commercial Activity studies and implementation of the resulting "Most Efficient Organization."

Arkin was responsible for managing information technology (IT) resources for SSC San Diego and SPAWAR Headquarters. He managed the conversion of much of the IT support to the Navy/Marine Corps Intranet in 2001.

Prior to his assignment as Director of Corporate Operations, John Chevrier served as the Command and Control Department deputy for operations. Chevrier is heading a newly reorganized code, which was restructured and refocused to better serve the operational needs of the Center and its workforce. The new code was formed by realigning the functions of the former Deputy Executive Director for Corporate Operations and the Deputy Executive Director for Science, Technology, and Engineering. The purpose of the reorganization was to enable continued execution of the Center's day-to-day operations while providing the resources to perform Center business process analysis and reengineering.

Supply and Contracts Department³

Supply and Contracts Department Head Cmdr. Craig Wheeler was selected for an individual augmentation assignment and was deployed to Iraq on 3 October 2004 for 6 months. He was assigned to the U.S. Embassy in Baghdad, working for the Project and Contracting Office (PCO) in a logistics billet. The PCO is responsible for all logistics support for the reconstruction of Iraq.

During Cmdr. Wheeler's absence, Keith Leung served as acting department head for the Supply and Contracts Department.

Command and Control Department⁴

Dr. Rich Jaffee was named head of the Command and Control Department. Jaffee brings broad experience in developing, integrating, and fielding command and control (C²) systems. He has held multiple engineering, project management, and line management positions, and has worked on numerous projects supporting C² initiatives during his career at the Center.

Fleet Engineering Department^{5, 6}

Fleet Engineering Department Head Augie Troncale retired at the end of September. Troncale ended a 36-plus year career devoted to design and development of antisubmarine torpedoes, in-service engineering, and life cycle support of C⁴ISR systems.

New department head Tim Smith joined the Center from SPAWAR Program Executive Office Command, Control, Communications, Computers, Intelligence, and Space. Smith served as program manager, Networks, Information Assurance and Enterprise Services.

Communication and Information Systems Department⁷

Don Endicott was named head of the Communication and Information Systems Department, where he assumed responsibility for design, development, integration, networking, and deployment of Navy joint and coalition strategic and tactical systems. Endicott previously served as Technical Director of the SPAWAR Office of the Chief Engineer, where he led initiatives to define the Navy's FORCEnet* technical agenda. SPAWAR initiatives included developing formal architecture and standards products,

* FORCEnet is "the operational construct and architectural framework for naval warfare in the information age that integrates warriors, sensors, networks, command and control, platforms, and weapons into a networked, distributed combat force that is scalable across all levels of conflict from seabed to space and sea to land." — *Chief of Naval Operations' Strategic Studies Group*

overseeing initial FORCEnet programmatic assessments, developing FORCEnet compliance criteria, and developing a FORCEnet Implementation Baseline.

SPAWAR Systems Facility Pacific, Guam⁸

Lt. Cmdr. David DeMille relieved Lt. Cmdr. Andrew Lambley as the Officer in Charge (OIC) of SPAWAR Systems Facility Pacific, Guam (Code 293), during a Change of Charge ceremony at Top O' The Mar, Nimitz Hill, Guam. Lt. Cmdr. Lambley reported to Program Executive Office, Integrated Warfare Systems, in Washington, D.C.

SPAWAR ALIGNMENT⁹

On 26 August, SPAWAR Commander Rear Adm. Ken Slaght and Deputy Commander Scott Randall provided an introduction to the coming alignment of the SPAWAR enterprise. The purpose of the alignment is to implement and execute FORCEnet (see footnote on previous page for definition) in over 400 different programs.

The technical codes, the field activities, and the Program Executive Offices will have a much stronger connection with the SPAWAR Chief Engineer.

Functional change leaders will look across the entire organization to evaluate and adopt best practices and efficiencies in such areas as test and evaluation, installs, finance, contracts, etc. Corporate Board of Director meetings will determine how to band technical groups and technical products for the overall corporation and integrate them into the FORCEnet concept.

NATIONAL SECURITY PERSONNEL SYSTEM (NSPS)^{10, 11}

The Department of the Navy (DoN) was scheduled to enter the new NSPS in June 2004. The Center was notified that the DoN June date was postponed until FY 05 (October 2004); later in 2004, the October conversion date was further extended.

By law, the new system will be based on pay-for-performance, which is already the basis of SSC San Diego's personnel system. In that regard, SSC San Diego was far ahead of other parts of the DoD that continue to operate in the "GS" system where automatic pay increases occur at certain time intervals. The law does not address the mechanics of how such pay-for-performance will be administered. Various DoD working groups have been assigned to develop the specific "rules of the road." The Center submitted the SSC San Diego Demonstration process as a "Best Practice" example for consideration by these working groups.

SSC San Diego representatives continued to interact with the DoD and DoN working groups and began making plans for Center teams to work on "local implementation" issues. SSC San Diego representatives were involved in the SPAWAR Demo Steering Group committees (pay, classification, and performance) critical to developing local policies and procedures. SSC San Diego representatives will also be involved in various human resources working groups as they develop the business aspects of the future personnel system.

ORGANIZATIONAL SURVEY^{12, 13, 14}

The civilian and military workforce participated in an online Organizational Assessment Survey conducted 10–27 February 2004.

The survey addressed a wide variety of workforce issues. The results of the Organizational Survey 2004 were announced in July. The favorable responses increased in every workforce dimension.

BASE CLOSURE AND REALIGNMENT (BRAC) COMMISSION^{15, 16, 17}

DoD requested that commanders of installations in the United States, its territories, and possessions gather information about their installations as part of the 2005 round of BRAC. The department will use BRAC to eliminate unnecessary infrastructure in order to provide funding to increase military capability.

The BRAC process has been fairly consistent throughout all the previous rounds, with some slight modifications in the current one. In that process, DoD must publish its proposed selection criteria for military departments to apply when making recommendations for closure and realignment. DoD published the proposed criteria in the Federal Register on 19 December 2003¹⁸, and the final criteria were published 12 February 2004¹⁹ in the Federal Register.

DoD will emphasize the following in BRAC 2005:

- Current and future mission capabilities and impact on operational readiness of DoD's total force
- Availability and condition of land and facilities at existing and potential receiving locations
- Ability to accommodate contingency, mobilization, and future total force requirements
- Cost of operations
- Extent and timing of costs for actions and savings resulting from them
- Economic impact on communities
- Environmental impact, including costs

These selection criteria form the basis for the determinations to be made by the BRAC commission.

To prepare for BRAC 2005 and for dealing efficiently and effectively with the data collection requirements, SSC San Diego established a BRAC Response Team, staffed by experts from across the Center, to gather data to represent the Center.

NEW PROFESSIONAL (NP) PROGRAM²⁰

The SSC San Diego NP Program hired 85 NPs for FY 2004. The NP Program is operated under the guidance of the Navy Career Intern Program (NCIP), which allows direct hiring of qualified engineer and scientist candidates. Under NCIP guidelines, the NPs serve a 2-year probationary period focused on training and professional development. Part of that is the 6-month NP touring period during which they take two nominally 3-month tours with different technical codes. This exposes the NPs to different technologies and work groups before they select a final assignment. NPs are also required to take additional classroom training and other professional development courses per an Individual Development Plan over the 2-year probationary period. NP candidates come not only from on-campus recruitment but also via direct application and by reference from SSC San Diego-sponsored internship programs such as the Naval Research Enterprise Intern Program.

STRATEGIC PLANNING AND INITIATIVES

SSC San Diego senior leadership continued to augment weekly tactical meetings on financial, technical, human resource, and similar topics with monthly Strategic Planning Meetings (SPMs). SPMs are geared to focus the leadership on longer term matters of substantial significance to the Center's future. Facilitated and supported by the Decision Support Group, the SPMs address the Center's financial and business plans, technology development and transition, potential impacts of Navy and Department of Defense level policies on the Center, and organizational improvement initiatives. Driven by SPM decisions and policies, Center long-term organization improvement efforts focus on implementation of High Performance Organization training and Balanced Scorecard.

SSC SAN DIEGO STRATEGIC PLAN²¹

A new version of the Center's Strategic Plan was posted on the Center's Intranet. The Center's Decision Support Group helped update the plan and create the web presentation.

An important part of the Strategic Plan is the Center strategy. The strategy is embodied in four strategic themes, which constitute the major elements of the Balanced Scorecard. Within each of those themes, there are objectives, measures for each of the objectives, and performance targets. The Balanced Scorecard is a tool for executing Center strategy. It uses measures and targets to show how the Center is doing in reaching stated objectives. If the Center is not doing well enough, an initiative, process, or procedure must be implemented to put the Center back on track toward reaching stated objectives.

Through the strategic plan on the web, any employee will be able to go into the plan, click on strategy (or Balanced Scorecard), drill down to objectives and measures, then view the targets and the actual measured data to see the Center's progress.

JOINT PROCESS ACTION TEAM (PAT)²²

As part of the DoD's transformation process, each of the services, Army, Air Force, Marine Corps, and the Navy, is provided powerful incentives to work together as a team to become more "joint." The SSC San Diego Joint PAT was implemented to address the Center's jointness issues through Center representatives.

Formerly, activities, operations, or organizations with two or more military departments participating were considered joint. "Joint" now includes all military services. The Joint PAT will provide more information to Center employees about the imperative for jointness.

PROJECT MANAGEMENT COUNCIL (PMC)²³

The PMC continued to develop appropriate project management practices, tools, improvements, and guidance for implementation on projects using input from all project managers at SSC San Diego, as well as input from the Systems Engineering Process Office.

In support of the PMC, each department also formed its own Project Management Advisory Council (PMAC). The purpose of the PMACs is to reach project managers in each division and branch who can assist the PMC in making recommendations about project management policy at SSC San Diego.

The PMC was established by former SSC San Diego Executive Director Dr. Robert Kolb at the 14 March 2003, Strategic Planning Meeting. The goal was to improve project management skills and practices within the Center while alternately achieving partial satisfaction of the "Standardize Technical Work

Processes” strategic objective of the Balanced Scorecard (see definition of Balanced Scorecard in the discussion of the the Strategic Plan above).

Initial efforts include establishing end-to-end project management requirements and responsibilities for selecting project management tools for Center-wide project manager use, establishing project manager training curriculum, and defining daily project manager operational processes for small, medium, and large projects.

One of the first tasks of the PMC was to review a draft SSC San Diego project management policy, SPAWARSYSCEN INST 5234.1A²⁴. The draft policy was circulated to all departments for review. The Navigation and Applied Sciences Department PMAC worked with department line managers and project managers to review the document and provide comments. These comments were presented to the PMC during a formal inspection of the draft instruction. SPAWARSYSCENINST 5234. 1A focuses on defining Center-wide policy and responsibilities of everyone involved in the project management process, with a goal of increasing project management skills throughout the organization. Future documents to be reviewed include a PM job description, a project manager's guide, a proposal guide, and a project management plan template.

Another focus of the PMC is to identify specific issues/concerns within the SSC San Diego project manager community. The PMC, through the department PMACs, surveyed project managers and line managers to identify specific issues/concerns that they have about project management at SSC San Diego. The PMC is committed to addressing issues to improve program management at SSC San Diego.

COMMUNITY OUTREACH

FIRST ROBOTICS^{25, 26}

Engineers from across the Center assisted FIRST (For Inspiration and Recognition of Science and Technology) Robotics teams at local high schools. The FIRST Robotics program brings industry, universities, mentors, students, parents, and the community together to develop innovative robots. Over 80,000 students and mentors from 1,000 teams participate in 30 regional competitions and one national championship.

The robotics team from the Preuss School, University of California San Diego, one of the Center-mentored teams, topped 300 other teams to win the Engineering Inspiration Award at the FIRST Robotics National Championships. The Engineering Inspiration Award at the FIRST Competition is the second highest award that a team can win at the national level.

MESA SHADOW DAY²⁷

The San Diego State University MESA (Mathematics, Engineering, and Science Achievement) Shadow Day for high school students was held in May. MESA is a math and science enrichment program that works with urban high school and university students from groups with low eligibility rates for 4-year colleges. Young people from the local high schools were assigned to “shadow” a science and engineering mentor for the day. Ten students from various high schools participated in the event, the largest group ever.

HIGH TECH HIGH INTERNSHIP PROGRAM²⁸

Four students from the High Tech High Internship Program assisted the Adaptive Systems Branch. The internship program counts as a required course and provides work experience. The group project demonstrated enabling technologies for an automated equipment transportation system similar to, but smaller than, the Army Future Combat System (a joint Army/DARPA program) Multifunction Utility/Logistics Equipment robotic follower. The project modified a Segway^{®†} Human Transporter by adding a cart and computer system to create the “Pony,” a robotic system that can follow troops automatically with a camera guidance system.

Under the guidance of the mentors and other Branch personnel, the students programmed the behavior and assembled the hardware. The small, lightweight Pony could transport 200–300 pounds of equipment or injured personnel. Another version of the Pony could follow troops at a greater distance or at a later time by using Global Positioning System technology. The High Tech High team presented their completed project to all Branch personnel on 8 June. Their work was also included in a technical paper submitted to the International Society for Optical Engineering Mobile Robots conference in October 2004 in Philadelphia, Pennsylvania.

ROBOTIC SUBMARINE COMPETITION²⁹

Students from San Diego State University joined defending champs Cornell, Michigan Institute of Technology, and 16 other schools in the 7th Annual International Autonomous Underwater Vehicle

[†] Segway[®] is a registered trademark of Segway LLC.

Competition, 29 July–1 August at SSC San Diego. The Center hosted the event at the Transducer Evaluation Center facility.

Sponsored by the Association for Unmanned Vehicle Systems International and the U.S. Office of Naval Research, the competition offers total prizes of up to \$20,000 to the teams that design, build, and deploy a “smart” robotic submarine that can navigate a course without any human intervention.

This year's competition included 19 teams from major universities and technical high schools from the U.S. and Canada.

NAVAL RESEARCH ENTERPRISE INTERN PROGRAM (NREIP)^{30, 31}

Students from the NREIP contributed to Center projects and programs. NREIP is an Office of Naval Research summer internship program that provides SSC San Diego with undergraduate and graduate students in a variety of disciplines from some of the best universities and colleges in the country.

Project areas included:

- Independent component analysis for signal decomposition designed to teach computers to distinguish between natural and man-made objects
- Converting Matrix Laboratory (MATLAB^{®†}) code to “C” code
- Creation of a Chief Technology Office that would link technologies and requirements together and assist SSC San Diego in creating and maintaining projects that would lead directly to accomplishing its strategic goals
- Speech recognition demonstration system that could be used with command and control systems
- Internal marketing analysis of Composeable FORCenet technologies
- Towed-array sonar system
- Underwater signals for communications
- Earthquake prediction research involving study of sound recordings

TECHNOLOGY MATCH DAYS^{32, 33}

SSC San Diego Director, Science, Technology and Engineering (Code 210), acted as Chief Technology Officer for the SPAWAR claimancy to jointly host the first Program Executive Office (PEO) Technology Match Day. The program was held with PEO Command, Control, Communications, Computers, Intelligence and Space (C4I) and SPAWAR on 1 September 2004. This event brought science and technology providers together with program officers from the PEO to discuss possible solutions to technology needs identified by program management offices. Tech Match Day focused on near-term needs and relatively mature technologies that could be inserted in an existing program of record to field enhanced capability in less than 3 years.

Technology presentations were given by SSC San Diego, SPAWAR Jacksonville, and industry personnel. Several solutions from Tech Match Day were incorporated by the PEO into proposals for Rapid Technology Transition funding by the Office of Assistant Secretary of the Navy for Research Development and Acquisition.

[†] MATLAB[®] is a registered trademark of The MathWorks, Inc.

SECTION 3

TECHNICAL HIGHLIGHTS

NAVIGATION AND APPLIED SCIENCES

HOMELAND SECURITY-RELATED TECHNOLOGIES³⁴

SSC San Diego's homeland security-related technologies were showcased at a conference and exhibition during the week of 12–15 July 2004. The event was held at the San Diego Convention Center and featured seminars and informational booths from private industry and government. The conference was sponsored by the Department of Homeland Security, Directorate of Science and Technology. Cross-departmental SSC San Diego projects represented at the conference included the following:

- Joint Perimeter Surveillance Command and Control
- Chemical/Biological Sensor Technology
- Medical Data Surveillance System
- Joint Wide-Area Tracking System
- Very High Frequency (VHF) Portable Amplified Communications Set
- Geographic Information System-based Model Animation
- Hierarchy Yet Dynamic Radio Assembly
- Information Operations Center of the Future
- Border and Transportation Security Network
- Robotic Systems Pool

JOINT INTERAGENCY TASK FORCE-SOUTH (JIATF-SOUTH)³⁵

The Airspace Systems Division JIATF South team was assessed as operating at the Software Engineering Institute Software Capability Maturity Model (SW-CMM) Level 3. This determination was based on an internal assessment completed in January by the Systems Engineering Process Office and department Software Process Improvement Agents.

The achievement of a SW-CMM Level 3 rating at SSC San Diego validates that a project is using well-defined, managed, and repeatable engineering and management processes in conformance with the 13 SW-CMM Key Process Areas and with the Center's institutionalized processes.

Operational systems supported by the JIATF South program at SSC San Diego are located at Naval Air Station Key West. JIATF South monitors all ships and planes in a 4000- by 4000-mile area extending from mid-Florida to the Antarctic Circle.

JIATF South conducts multi-sensor track and information processing, and command and control operations, in the United States Southern Command area of responsibility with five defined missions: counter-drug operations, sensitive reconnaissance, ground-controlled intercept, contingency, and search and rescue.

JIATF South uses integrated multi-service systems receiving data from ground-based radar, mobile assets, and other sensor assets through digital and voice communications links; and SSC San Diego is said to be supporting the only existing system performing true data fusion. SSC San Diego is responsible for software development, systems engineering, systems integration, configuration management, quality assurance, testing, training, on-site installations, and operational and maintenance support.

MARINE AIR TRAFFIC CONTROL AND LANDING SYSTEMS (MATCALS)^{36, 37, 38}

Note: Accomplishments described here occurred in CY 2003.

During the third and fourth quarter of FY 2003, the MATCALs team provided engineering, technical, and logistics support to an unprecedented deployment of five Marine Air Command Squadron detachments in both Operation Iraqi Freedom and Operation Enduring Freedom. During the same period, the MATCALs team identified war-damaged systems, initiated requests and justifications for supplemental war funding to repair that damage, and received and processed over \$8 million of supplemental funding before the end of the fiscal year. This work was above and beyond the budgeted workload for the fiscal year.

The MATCALs team is a Center employee/contractor effort that has supported the war efforts in Afghanistan and Iraq. MATCALs served as a portable tactical airfield system for the U.S. Marines in Uzbekistan, Kyrgyzstan, and Iraq. It can be moved and set up at an existing airfield or used with a tactical airfield set up with a steel matting runway. The system is self-powered by generators. There are two radar capabilities in the system for conducting instrument flight rules (IFR) operations: the AN/TPS-73 surveillance radar that detects air traffic out to 60 miles and the AN/TPN-22 precision guidance radar for the final approach. These radars feed into the AN/TSQ-131 Communications and Control Subsystems where IFR air traffic controllers monitor multi-mode display screens to control air traffic.

All MATCALs systems are used in arduous, sometimes combat, conditions and then rotated back for repair and refurbishment. In addition, when the U.S. Marines were preparing to deploy to the theater, the MATCALs team made on-site visits and checked out systems to assess the wear and tear from training operations. They quickly repaired any damage on very short notice.

GREEN ABALONE TRIAL TEST PLANT³⁹

The Marine Environmental Quality Branch announced the first trial test plant of 500 3- to 5-inch green abalone off Point Loma. The Navy is committed to good stewardship of the ocean and marine environment. As part of this environmental testing, SSC San Diego spawns and grows the rare and endangered abalone in the laboratory, or "farm."

Divers from the Scripps Institution of Oceanography selected a planting site for 200 abalone at a depth of approximately 7 meters. The outplanting habitat includes large boulders with crevices, smaller broken rock reefs, and flat pavement. Other location criteria were predator presence, food availability, and ease of monitoring their progress. Records will be made of abalone densities, predators, scavengers, and kelp species. A team of divers from the City of San Diego's Metropolitan Wastewater Department is making plans for similar outplanting activities using SSC San Diego's green abalone. Another 300 abalone from the farm on Point Loma were housed in plastic holders, or "condos," and transported in insulated coolers to several sites.

While it is still very early in the outplanting project, preliminary evidence is encouraging. New outplanting methods are being devised to allow the young abalone to find natural refuge within the reef and to confine them to a known range for follow-up surveys. It is hoped that questions of verifiable survival, growth, and recruitment through close proximity for reproduction will be answered over time. By confining the outplanting, abalone should be more easily accounted for than prior attempts at assessments in the open ocean.

NETWORKED-INTEGRATED REMOTELY OPERATED WEAPON SYSTEM (NROWS)⁴⁰

A team from the Unmanned Systems Branch conducted software and hardware design reviews of the NROWS and demonstrated the improved technology to a panel from the Navy Explosive Ordnance Disposal Technical Division on 27 October. The initial application for NROWS is to provide a very close-in response to intruders in a fixed, indoor installation such as weapon storage bunkers. Additionally,

the system will be mounted on unmanned ground vehicles to extend their capabilities in an outdoor environment for missions such as protection of missile launch facilities.

The NROWS project goal is to develop a resource that provides field or base commanders with a real-time, unattended weapons pod that quickly extends the delay/denial response capabilities at high-value installations or in a tactical scenario. The NROWS can be integrated with autonomous surveillance, detection, and assessment capabilities along with automated target tracking to enable timely mission-essential information and response to enemy activity.

Major system components include a custom aiming platform manufactured by TeleRobotics Corporation (TRC) and a command, control, and communications (C³) system developed by Code 2371. The C³ system incorporates sensor-assisted automatic target prosecution as designated by the human operator. The underlying technology incorporates vision-based predictive motion tracking previously developed by Code 2371.

COMMAND AND CONTROL

HOMELAND SECURITY-RELATED TECHNOLOGIES

See "Information Operations Center of the Future (IOCOF)" under Homeland Security-Related Technologies in the Navigation and Applied Sciences section.

GROUND MIDCOURSE DEFENSE (GMD)⁴¹

The Ballistic Missile Defense System (BMDS) Integrated Product and Service Team (IPT) contributed to the receipt, installation, and checkout of a critical component of the GMD System at SSC San Diego. GMD Systems Integration and Checkout-1 is the first step in fielding GMD initial defensive capability.

The Missile Defense Agency (MDA) is developing and testing the elements of a BMDS that will be capable of engaging all classes of ballistic missile threats. The program will integrate advanced interceptors, sensors, battle management, and command and control elements into layered defense segments that will engage threat targets in all phases of flight.

The GMD program is intended to counter a limited ballistic missile strike against the United States homeland. The GMD Program is tasked to design and construct the initial BMDS test bed to ensure continued GMD development and prepare test bed upgrades.

The Center's involvement began late in the 1990s and has been ongoing and aimed at the Navy's Aegis Ballistic Missile Defense (BMD) program, represented by theater-wide/area-wide programs. The Center provided Link-16/Tactical Digital Information Link subject-matter experts onboard ships to focus on the interoperability aspects of development. The role expanded to systems engineering, specifically in developing the Common Data Link Management System. The Center also expanded its role with other programs such as the Joint Tactical Terminal and Global Command and Control System-Maritime.

In addition to direct support of MDA and the various BMD elements, Center efforts are supporting the SPAWAR Advanced Tactical Data Link Systems Program Office. SSC San Diego provides technical expertise and infrastructure for developmental testing through test tools and facilities.

The cross-department IPT team includes expertise from the Command and Control Department, Fleet Engineering Department, and Communication and Information Systems Department.

AEGIS BMD PROJECT OFFICE⁴²

Center Link-16 in-service engineering activity representatives successfully completed support to the Aegis BMD Project Office Flight Missions (FM)-5 and FM 6.

The Aegis BMD Program will provide the capability for Navy surface combatants to actively defeat ballistic missiles in the midcourse phase of the exo-atmospheric battle space. The flight mission scenarios are designed to allow the Aegis Weapon System to detect, track, and engage a short-range ballistic missile in the ascent phase of flight, based on an off-board sensor cue, and guide the Standard Missile-3 to achieve an intercept.

Highlights of SSC San Diego involvement during FM-5 and 6 included the following:

- First time that a joint range extension was used in a live BMD event.
- First time that the in-house Combat Direction System Development and Evaluation Site Demand Assigned Multiple Access configuration was used in any live event.

- First time that the Missile Defense Communications and Operations Node was operated out of SSC San Diego during a live BMDS event to generate a data update request, including via a Joint Range Extension Gateway.

COMPOSEABLE FORCE_{net}⁴³ HUMAN-SYSTEMS INTEGRATION (CFn-HSI) LABORATORY⁴⁴

The CFn-HSI Laboratory was completed in early 2004. The CFn-HSI lab provides DoD with the capability to assess, evaluate, and document human performance effectiveness in existing, modified, and newly proposed systems and applications.

The CFn-HSI lab will support HSI compliance within FORCE_{net} and serve as a conduit to transition human-centered research and development from laboratory settings to the Fleet. The key CFn-HSI Laboratory objectives are:

- Provide a human performance measurement facility for programs and systems to assess speed, accuracy, situation awareness, workload, general ergonomics, and training effectiveness.
- Assess HSI compliance as systems and capabilities are transformed into FORCE_{net}.
- Support HSI assessment in Trident Warrior exercises and other sea trial-related events.
- Identify, develop, evaluate, and institutionalize human performance metrics.

Exploiting the Distributed Engineering Plant connectivity, the CFn-HSI lab will serve as a component node in the Navy's Human-Systems Performance Assessment Center, a network of distributed facilities and capabilities across the Navy. The mission of the Human-Systems Performance Assessment Center is to enhance fleet readiness and operational effectiveness by providing the personnel, expertise, equipment, connectivity, tools, models, environments, and alliances necessary to measure and analyze warfighter-system performance across all phases of the system life cycle. To facilitate access to the fleet, the CFn-HSI lab will coordinate through the Distributed Engineering Plant with the products lab at SSC Norfolk to ensure both Atlantic and Pacific fleet representation.

GLOBAL COMMAND AND CONTROL SYSTEMS-MARITIME (GCCS-M)⁴⁵

The Command and Intelligence Systems Division GCCS-M team was determined to be operating at the Software Engineering Institute Software Capability Maturity Model (SW-CMM) Level 3. This determination was based on an internal assessment conducted by the Systems Engineering Process Office and department Software Process Improvement Agents.

The achievement of a SW-CMM Level 3 rating at SSC San Diego validates that a project is using well-defined, managed, and repeatable engineering and management processes in conformance with the 13 SW-CMM Key Process Areas and Center institutionalized processes.

GCCS-M is the principal command and control system used by ashore and afloat naval forces. SSC San Diego is responsible for systems engineering, systems integration, configuration management, testing, training, Fleet installations (via SPAWAR 04, Installations and Logistics), and Pacific Fleet support.

GCCS-M 4.X ARCHITECTURE⁴⁶

Note: Accomplishments described here occurred in CY 2003.

The GCCS-M Project conducted a system stress test of the new GCCS-M 4.x architecture 1-12 December 2003. This test was conducted using the exact hardware that will be put on USS *Nimitz* (CVN

68), consisting of four SunTM V240 SolarisTM[§] servers, six Dell DL 380 personal computer servers, and 54 Compaq Evo^{®**} D510 C personal computer clients. Software was GCCS-M 4.x Build 11. This test was the first of this magnitude using equipment that will be installed onboard a ship since the Joint Maritime Command Information System 2.2 stress test in 1995. The purpose of the test was to evaluate how the new software and hardware would function in a simulated shipboard environment.

GCCS-M provides a single, integrated, scalable C⁴I system that receives, processes, displays, and maintains current geo-location information on friendly, hostile, and neutral land, sea, and air forces, and provides tools to connect that information with related imagery and intelligence information. GCCS-M 4.0 is a UNIX^{®††}/Windows^{®‡‡} 2000-based suite of C⁴I, surveillance, and reconnaissance software that will coexist with other programs of record (POR) and non-POR software on a facility's GENSER (General Services) and Sensitive Compartmented Information networks.

The test was conducted at Seaside Building 606, Lab 339. Watch standers operated in a simulated shipboard environment. The watch standers were assigned a position and carried out tasks that would be duplicated by shipboard personnel. This scenario created a high-tempo environment that stressed the system to verify that it could operate in real-world situations.

Personnel from *Nimitz* also participated in the test. System administrators and operators were able to sit down at machines and see the differences between the new 4.x and the older 3.x systems now in the fleet. This was their first look at the software to be installed onboard the ship in the spring of 2004. They were able to participate in tests as well as see the new capabilities and functions of the system.

INFORMATION WARFARE COMBAT ASSESSMENT TOOL (IWCAT)⁴⁷

SSC San Diego's Information Operations Center of the Future (IOCOF) successfully conducted an experiment 14–18 June to evaluate IWCAT.

IWCAT was developed by the Air Force for inclusion in a Joint Information Warfare Planning Capability (IWPC) suite of tools. IWPC is a planning tool that automates the information operations/information warfare planning and analysis functions and permits data collaboration, modeling, and fusion of key targets most critical to an adversary's warfighting capability. IWCAT provides an effects-based means to evaluate direct tangible and indirect behavioral effects of information warfare techniques.

To obtain an objective evaluation, complementing Air Force requirements with maritime input, the Air Force Research Laboratory tasked the IOCOF to evaluate IWCAT standalone software application functionality using Navy information operations specific requirements and perspectives. The experiment was conducted in the IOCOF to provide a realistic environment for fleet personnel to evaluate IWCAT.

ÜBER CHAT⁴⁸

The Advanced Concepts and Engineering Systems Branch is refining the peer-to-peer architecture of the Low Bandwidth Enhanced Chat Program, or "Über Chat," a chat-centric program developed to work across line-of-sight radio links, such as the VRC-99b radios.

[§] SunTM and SolarisTM are trademarks of Sun Microsystems, Inc;

^{**} Compaq[®] and Evo[®] are registered trademarks or trademarks of Compaq Information Technologies Group.

^{††} UNIX[®] is a registered trademark of The Open Group.

^{‡‡} Windows[®] is a registered trademark of the Microsoft Corporation.

During 2004, the branch worked on the tracked messaging between different radios via supernode-to-supernode communications. This will allow messages sent between the different radios to be queued up and resent if a message does not make it to its target. Also being added is the capability to disable the peer-to-peer architecture to allow legacy systems to use the backwards compatible Internet Relay Chat (IRC) portion of the program separately.

The Über Chat team is also implementing the instant messaging capability for the peer-to-peer architecture. A private instant message window will hold instant message history and managing the whole process of sending, alerting, and replying to instant messages. IRC commands are also being added into the IRC portion of the Über Chat client. All these changes, as well as ensuring robustness of Über Chat, are being made to finalize the software transition to U.S. Northern Command as their IRC client.

Über Chat is a subproject of the Adaptive Systems Branch Intrabattle Group Wireless Network project.

WEB-BASED SCHEDULING (WEBSKED)⁴⁹

WebSked was designated as the Navy's only software program for reporting ship employment schedules and contingency plans in the maritime environment. The improvements in efficiency and effectiveness that WebSked has brought to scheduling have yielded significant cost benefits according to a recent Office of the Chief of Naval Operations message. The message stated that WebSked is the Navy's official scheduling tool replacing all previous scheduling systems that include spreadsheets and handwritten displays; and applications such as VIPER, PC EmpSked and command-unique systems. All schedule users were to switch their reports to WebSked by 1 September 2004.

To support this large increase in WebSked usage, system servers were installed by SSC San Diego in the Commander, Navy Central Command and Commander in Chief, Naval Command Europe areas of responsibility in August 2004. These servers augment existing installations at Commander, Pacific Fleet and Commander, United States Fleet Forces Command.

Fleet schedulers serve as a vital tool for operational planning, situational awareness, and the status of forces. Timely and accurate reporting of schedule data is required to optimize planning efforts and keep decision-makers informed. The schedules represented by past systems, technologies, and processes could not be aggregated into an integrated picture of scheduling operations.

USABILITY AND ENGINEERING RESEARCH (USER) LABORATORY⁵⁰

The new USER Laboratory was officially opened for business on 26 October 2004. The USER Laboratory contains design workspaces and individual or group testing areas complete with Multi-Modal Watchstations. The laboratory is housed in the renovated Building 368 and managed by the User-Centered Design Branch.

The USER Laboratory provides a facility for bringing the warfighter into systems development at the onset of the requirements definition process, from task analysis to prototype design, and throughout the various stages of usability testing. This early and frequent involvement of the warfighter produces systems that meet operational needs making them more effective and efficient.

URBAN RESOLVE⁵¹

Urban Resolve, Phase 1, was completed in October. This is a three-phase, multi-year, human-in-the-loop virtual experiment set in a joint urban operations scenario of the year 2015. Urban Resolve explores key aspects of future joint urban operations and possible solutions for issues that surfaced through the joint lessons learned. It will feed into developing a concept for future joint urban operations that would allow

military forces to operate with the same decisive effect in complex urban environments that are currently achieved in open terrain.

The U.S. Joint Forces Command Joint Experimentation Directorate J9 and the Joint Urban Operations Office sponsor Urban Resolve. It is executed in partnership with the Institute for Defense Analyses, Joint Advanced Warfighting Program. Opposing force activities (Red Cell) are played from the Topographical Engineering Center at Fort Belvoir, Virginia. Noncombatants (Green Cell) are played from SSC San Diego. Urban Resolve uses the SSC San Diego-developed Composeable FORCENet visualization tool at the J9 lab. The friendly forces (Blue Cell) are played out of J9. The experiment also relies on two scalable parallel processor computers at Wright-Patterson Air Force Base, Ohio, and on the island of Maui, Hawaii. These facilities are all linked via the high-capacity Defense Research Engineering Network. Phase II experiments/trials will begin in November of FY 2005.

The first three trials were conducted from June through August 2004. Trial 4 was completed 12–22 October and was the last experiment for Phase I. The Phase I scenario involved a U.S.-led coalition force that confronted and overcame a skilled adversary equipped with modern capabilities in an urban environment. Phase I focused on situational understanding provided by intelligence, surveillance, and reconnaissance (ISR) collection and analysis using various combinations of sensors that might be used in the year 2015. The experiment pitted friendly forces against an adaptive adversary in a realistic environment where civilians performed daily routines such as traveling to work and going out to lunch. The friendly forces used human intelligence with the advanced ISR technologies to detect, locate, and track adversary systems and personnel inside a densely populated urban area. The adversaries could be difficult to locate because of sight limitations caused by buildings and urban clutter, such as dumpsters and trash trucks, which could be confused with tanks. The adversarial forces used increasingly effective means of signature reduction, including camouflage, concealment, and deception to hide from friendly ISR, while moving among the neutral inhabitants of the city.

ENHANCED NAVAL WARGAMING SIMULATION (ENWGS)⁵²

SSC San Diego led the ENWGS modernization effort in FY 04, moving the obsolete system (2.4 million source lines of code) to a new personal computer (PC)-based, LINUX^{®§§} operating system with flat-panel displays. Initial system performance measurements show that the new system works 10 to 40 times faster than the old system for similar operations. Functionality improvements were also made to include new terrain representation, upgraded data and information system interface functionality, new landing craft capabilities, new display/mapping capabilities, initial air tasking order and tactical electronic intelligence capabilities, detection and classification fidelity improvements, new sonar/sonobuoy representation, and mining upgrades.

The modernization was fully realized by demonstrating the new system running on PC laptops over a wireless local-area network connected to several C⁴I systems. This was demonstrated during the ENWGS User's Group meeting at the Tactical Training Group, Atlantic Facility in July 2004. SSC San Diego completed the modernization effort on 30 September 2004, and turned over all products and processes to the maintenance organization, Computer Sciences Corporation, in San Diego. The handover included the latest modernization release, PC version 6.1, and all software development supporting documentation and tools.

^{§§} LINUX[®] is a registered trademark of Linus Torvalds.

FLEET ENGINEERING

CONSOLIDATED PRODUCTION FACILITY (CPF)⁵³

The CPF completed a major expansion project to more than double the amount of floor space available for production and integration of C⁴I. The 20,000-square-foot facility provides a broad spectrum of services to support commercial off-the-shelf/government off-the-shelf system integration and product life cycle support.

The Center's goal was to consolidate many dispersed production activities across the Center into a single facility. Completion of this expansion project has enabled the Center to fulfill this goal. Savings are passed on to sponsors through economies of scale gained by common processes and procedures, common products, combined material procurements, and the ability to leverage staff across multiple customers and product lines.

JOINT WARRIOR INTEROPERABILITY DEMONSTRATION (JWID) 04⁵⁴

SSC San Diego's Advanced Concepts Site hosted JWID 04 in support of SPAWAR's Operational Experimentation and Demonstration Division (Sea Trial) and the Chairman Joint Chiefs of Staff. JWID is an annual event that enables U.S. combatant commands, services, and agencies to partner with coalition countries to investigate command, control, communications, and computer solutions to relevant and timely core objectives. JWID 04 was conducted 14–25 June and included participants from more than 20 coalition countries at locations worldwide.

The Combatant Operational Commander for JWID 04 was U.S. Northern Command, Peterson Air Force Base, Colorado Springs, Colorado. In support of its mission, one focus for the exercise was improving communications and information sharing between DoD and the civilian authority. This Military Assistance to Civilian Authority focused on helping the command meet the challenge of developing information-sharing capabilities between DoD and civilian agencies through advancements in technology, tactics, procedures and policy.

UNITED STATES PACIFIC COMMAND (USPACOM) HQ21⁵⁵

SSC San Diego was tasked to execute the C⁴I transition into the new headquarters (HQ) building for USPACOM at Camp H. M. Smith in Honolulu, Hawaii. This massive C⁴I effort was budgeted for \$50.3 million and involved the transition of over 100 systems.

The USPACOM personnel transition to the new headquarters took place 20 February–8 March 2004. Special Operations Command, Pacific (SOCPAC), a USPACOM subordinate unified command, also transitioned into the building 19–21 March. The six-story, 275,000-square-foot facility will house USPACOM, SOCPAC, and support staff.

Called the Nimitz-MacArthur Pacific Command Center, the new headquarters will serve as the hub for USPACOM's Asia-Pacific theater. The new facility is a model for future military C⁴I headquarters into the 21st century. The Command Center provides critical information and advanced decision-making tools to allow real-time crisis management. Connectivity and interoperability are available from the President of the United States, the Secretary of Defense, and the Joint Chiefs of Staff, through the service components, subordinate unified commands, and joint task force groups, and down to coalition partners and even local governmental organizations.

SSC San Diego participated in the concept development process beginning in June 1997. Early involvement by SSC San Diego allowed for C⁴I infrastructure to be integrated into the building design.

In November 1998, an SSC San Diego team was organized to execute the transition of all C⁴I assets into the new headquarters. By 2004, the workforce expanded to over 60 full and part-time Hawaii-based engineers and technicians, a few from San Diego and Charleston, and many more contractors and installers providing additional expertise and support.

SSC San Diego's involvement opened up many new business opportunities. Additional C⁴I tasks have emerged in the Nimitz-MacArthur Pacific Command Center and several new military construction projects are already in planning stages.

USS *BLUE RIDGE* (LCC 19) MODERNIZATION⁵⁶

USS *Blue Ridge* (LCC 19), flag ship for Commander United States Seventh Fleet, underwent an EDSRA (extended drydocking selected restricted availability) in Yokosuka, Japan.

SPAWAR Systems Facility Pacific, Yokosuka, Japan, equipped Blue Ridge with an extensive list of modernization upgrades including the most capable and robust C⁴I suite of any floating platform in the U.S. Navy.

GROUND MIDCOURSE DEFENSE

See "Ground Midcourse Defense" in Command and Control Department.

SSP *KAIMALINO*⁵⁷

On 1 October 2004, the Stable Semisubmerged Platform (SSP) *Kaimalino* was transferred to the University of Hawaii. This transfer of custody will benefit both the Navy and the university as it will put *Kaimalino* back into service as a near-shore research vessel. The Navy and other government agencies will be able to charter the vessel for future projects. *Kaimalino* was developed in 1970 as a combination work boat and test platform.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

FIBER OPTIC MICRO CABLE (FOMC)⁵⁸

The FOMC winding facility provided support to several classified programs by preparing, packaging, quality control testing, and shipping of FOMC coils for use by the Navy. Currently, the FOMC team is the Navy's only source for small cable precision winding.

Two of the programs were involved in supporting the war effort in Afghanistan and Iraq. This requirement resulted in a significant increase in support and production provided by the FOMC team. Additionally, a third program has required a continuing and constant delivery of material to accommodate an accelerated test and training schedule necessary to meet additional operational deployment schedules.

HIGH PERFORMANCE COMPUTING RESOURCES⁵⁹

The entire suite of the MathWorks Incorporated scientific software packages were available to Center scientists and engineers on the Center's classified and unclassified high performance computing resources for 2 months at no direct cost to the Center.

In the last 6 to 7 years, the use of the MATLAB^{®***} software environment by the DoD HPC community, as well as SSC San Diego and SPAWAR scientists and engineers, has been growing steadily. From January 2000 through February 2004, 208 scientists and engineers from SSC San Diego and SPAWAR have attended 13 MATLAB courses hosted through the auspices of the DoD High Performance Computing Modernization Program's Programming Environment and Training Program.

The availability of MATLAB, SIMULINK[®], Toolboxes, and Blocksets offered the Center's technical community a unique opportunity to acquaint themselves with the most advanced computational modeling and simulation capabilities available to scientists and engineers within the industry and academia.

*** MATLAB[®] and SIMULINK[®] are registered trademarks of The MathWorks, Inc. MATLAB is a computing language and interactive environment for algorithm development, data visualization, data analysis, and numerical computation. SIMULINK is a platform for multidomain simulation and Model-Based Design of dynamic systems.

COMMUNICATIONS AND INFORMATION SYSTEMS

SUBNET RELAY⁶⁰

Note: Accomplishments described here occurred in CY 2003.

Subnet Relay was demonstrated in a joint Canada/U.S. trial held aboard four Canadian warships as they transited from Victoria, British Columbia, to San Diego in November and December 2003.

Subnet Relay, designed by the Center's Network Centric Warfare Analysis Branch, provides a self-organizing data network that adapts as ships maneuver into and out of range, organizes transmissions to support multiple platforms, and provides automatic relay of traffic to extend connectivity when direct connectivity is not available. IP Unwired of Ottawa, Ontario, developed a Subnet Relay prototype. The resulting system can be used to support text chat, whiteboarding, messaging, file transfer, web browsing, and other collaborative activities.

JOINT TACTICAL RADIO SYSTEM TECHNOLOGY (JTRS) LABORATORY (JTeL)⁶¹

JTRS Technology Laboratory, the testing and certification arm of the JTRS Joint Program Office, achieved full operational capability for testing on 1 October. JTRS radios will be software-reprogrammable, multi-band/multi-mode capable, networkable, scalable in terms of form, fit, and cost, and will provide growth capability through an open system architecture that enables new technology insertion. The radios will provide interoperability with currently deployed radios by operating with many legacy waveforms, and will also have the ability to incorporate new waveforms as they are developed. The JTeL team is a joint effort between SSC San Diego and SSC Charleston.

GLOBAL POSITIONING SYSTEM (GPS) AIRBORNE PSEUDOLITES EXPERIMENTS (GPX)⁶²

Members of the Signal Processing and Communications Technology Branch participated in Flight Test 3, an operational demonstration of the Defense Advanced Research Projects Agency GPS GPX Program. This was the final GPX program test and major demonstration conducted at Holloman Air Force Base and White Sands Missile Range 10–19 May.

With pseudolites transmitting GPS-like signals, a constellation of pseudolite equipped aircraft, two military C-130Es, and two commercial aircraft, a Falcon 20 and Sabreliner were flown in orbits surrounding a GPS jamming field. In addition, two ground-based pseudolites were employed as backups. Two user equipment aircraft platforms, a C-12J and F/A-18 Captive, carrying two Joint Direct Attack Munitions (JDAM) were flown through the jamming field simulating a bombing run. The C-12J flew with two side-by-side F/A-18 Embedded GPS Inertial (EGI) navigation units. One was an operational unmodified unit and the second unit only software modified to make it pseudolite capable.

The F/A-18 flew with a software modified (pseudolite capable) and flight certified EGI unit. Both aircraft flew through a ground based GPS jamming field and demonstrated successful pseudolite navigation when normal GPS navigation was denied. Telemetry provided by the F/A-18 and JDAM showed successful F/A-18 pseudolite navigation and navigation transfer alignment to the JDAM.

GROUND MIDCOURSE DEFENSE

See "Ground Midcourse Defense" in Command and Control Department.

APPENDIX A: CY 2004 ACHIEVEMENT AWARDS

PRESIDENTIAL AWARDS

Legion of Merit Award

Captain Patricia A. Miller, for leadership as Executive Officer of SSC San Diego from July 2001 to July 2004. The award citation recognized Captain Miller's leadership, managerial acumen, and command presence as the Executive Officer of a 3700-person civilian workforce, 75 officer and enlisted component, and \$1.3 billion annual operating budget. Challenged during a period of unprecedented Force Protection concerns, she effectively teamed with the Region to foster a strong working relationship that provided the physical security and industrial espionage protection that her unique research and development laboratory required. Captain Miller played a key role in strategic planning for the Center. Her implementation of the Balanced Scorecard methodology helped focus the Center on its core competencies and provided a conduit to focus individual actions on tasks that support the strategic plan.

NAVY AWARDS

Navy Superior Civilian Service Award

Ron McClair, for his "outstanding professional knowledge, unsurpassed resourcefulness, and a visionary plan that was instrumental in establishing a significant command, control, communication and computers (C⁴) upgrade to support Joint Task Force (JTF) 519." McClair's award was for service as the fleet command center technical director. He was specifically commended for planning and executing the Flagship Makalapa C⁴ upgrade, which supported COMPACFLT in the operational role as Commander, JTF 519. The JTF 519 mission required transformation of COMPACFLT headquarters into a site capable of supporting an operational joint task force. McClair developed an innovative solution that modified various conference rooms into battle cells with C⁴ equipment to support command and control functions and allow communications within the staff.

Navy Meritorious Service Awards

Stephen Ambrosius is project manager and chief system architect for the Web-Based Scheduling (WebSked) project. He is the driving force behind development and fielding of this innovative ship employment scheduling application. The improvements in efficiency and effectiveness that WebSked has brought to scheduling have yielded significant cost benefits for the Navy.

David Andersen, is the deputy for program development for the Tactical Systems Integration and Interoperability Division where he successfully manages and provides technical oversight on a variety of programs. These programs have a combined budget of over \$60 million annually from over 70 sponsors, including all aspects of Link-4A, Link-11, Link-16, and Missile Defense development and testing.

Ron Ballard is the Marine Air Traffic Control and Landing System operational software/firmware project manager. He leads a team in developing and fielding four major versions of the operational software/firmware. His team's effort delivered upgraded software/firmware to the Desert Storm detachments within 3 weeks of the message request.

Mark Berry is team lead in the Joint and National Systems Division. He supervised 25 employees and provided engineering expertise for the Low Probability of Intercept and Detection radio frequency devices. In 2002, he accepted an assignment as the chief technology officer for the Defense Policy

Analysis Office, where he was instrumental in designing and implementing the critical information technology infrastructure.

Lisa Calvin is administrative officer for the Commanding Officer, Executive Director, and Deputy Executive Director for Corporate Operations. She provides support and counsel to senior management, chairs the SSC San Diego Administrative Council, and represents line managers as the Cost Center Manager Process Owner for Enterprise Resource Planning.

Frederick Carter consistently contributed to SSC San Diego; Commander, Pacific Fleet; and Commander, U.S. Pacific Command missions as an antisubmarine warfare analyst, command, control, communications, computer, and intelligence (C4I) systems engineer, and project manager. Most recently he led the successful integration of the Coalition Wide-Area Network with the Combined Enterprise Regional Information Exchange System.

Russ Clement has headed the Infrared Sensing Information Systems program since 1999. He provides leadership and technical expertise on technology development and testing programs for the Defense Advanced Research Projects Agency and the Missile Defense Agency.

Eric Coolbaugh became program manager for a major Department of Homeland Security effort that provides C⁴I surveillance and reconnaissance interoperability assistance and leadership. This assistance is to major urban areas and states throughout the country for preventing, responding to, and recovering from terrorist activities. Under his leadership, several codes at SSC San Diego have become engaged in these efforts to protect the homeland.

Dana Cottrell has been a leader in Navy undersea surveillance, including more than 10 years as technical program manager of the highly regarded Surveillance Towed Array Sensor System and Low-Frequency Active System.

Jim Farley is lead engineer for secure voice systems providing secure voice program support to the Department of Navy and the SPAWAR community. Under his leadership, the Secure Voice Team from the Communication Security Systems Engineering Branch has stepped up secure voice support.

David Garcia advises the comptroller and Center management on all budget matters. He has recommended many automated processes that have vastly improved analysis and special reporting. Well versed in all of the exhibits, he knows what and how much data must be collected to complete the exhibits, outlines the issues and assumptions required to proceed, and advises the Center of the consequences of its decisions and assumptions.

David Hill is the deputy for the Multi-Functional Information Distribution System (MIDS) Joint Tactical Radio System (JTRS) product team. Due to his efforts, the General Officer/Flag Officer JTRS Tactical Aircraft Summit decided that MIDS JTRS would become the medium-size solution for tactical aircraft.

Julie Howell is the Coalition Chat Line (CCL) project leader. Howell led a team that participated in multinational exercises in Germany, Poland, and the Republic of Georgia. Her efforts ensured that each event was successfully executed and exceeded customer expectations. Howell also coordinated the successful deployment of the CCL system to four separate sites in Iraq in support of Operation Iraqi Freedom.

Richard P. Johnson leads and mentors a mechanical design team of 11 engineers for five projects including the Ocean Systems Division's two largest and most profitable. He is a world leader in applying non-metallic materials to sub-sea applications.

Dave Kellmeyer has been the project manager to design a revolutionary human-computer interface for the Tactical Tomahawk Weapon Control System. These projects totaled \$13.9 million over the last 3

years and employed over 30 scientists and engineers across seven labs. He not only met all project objectives, he exceeded the objectives by transitioning some of the designs into an early build.

Dr. Stephan Lopic led the English-speaking nations in developing coalition interoperable network communications using ultra-high-frequency line-of-sight radios. This resulted in important research and transitions to tactical requirements.

Dana Magee is the Intelligence, Surveillance and Reconnaissance Department's administrative liaison to the Human Resources Office, supporting personnel actions and service across the department. Her comprehensive assistance in all aspects of the hiring process has been an integral part of the department's vitality and growth.

Bill Marsh is the engineering team leader for the Mobile Inshore Undersea Warfare (MIUW) program. He has been the lead system design engineer since the beginning of the program directing the production and delivery of 22 MIUW sensor systems to the Naval Coastal Warfare Naval Reserve Units.

Paul Meisinger provided exceptional system engineering support for the naval mission planning systems supported by the C⁴I Programs Office, Philadelphia. As the lead systems engineer for the Tactical Automated Mission Planning System, he provided technical leadership and management support for the full spectrum of engineering activities from development through fielding.

Sharon Miller has served as the Fleet Engineering Department administrative officer since 2001, exhibiting a high level of professionalism and competence, and serving as a key member of the Department Performance Management Advisory Council.

John Mitchell acted as head of the Submarine Electronic Surveillance Measures Systems Branch from 2 October 2003 through 3 March 2004. He has been one of the key players in homeland security-related work received from the Commander Naval Installations. He effectively used a mix of existing branch personnel and New Professionals, along with other cross-Center resources, and increased the antiterrorism/force protection-related work from 2 work years to 8 work years in a little over a year.

Neal Miyake was part of the Headquarters (HQ) 21 C⁴I project management team responsible for the relocation of U.S. Pacific Command C⁴I systems and personnel from existing spaces to the new Nimitz-MacArthur Pacific Command Center. This was the largest single C⁴I installation project accomplished by SSC San Diego.

Larry Nixon is the project manager for the Submarine Low-Frequency/Very Low-Frequency VMEbus Receiver (SLVR), the Minuteman Minimum Essential Emergency Communications Network Program VLF Terminal, and the Increment 1 KG-34 Replacement Programs. Nixon served as the software manager through much of the SLVR development and was key to its success. SLVR is deployed on all submarines and related shore sites.

Bruce Offord has worked on a wide spectrum of microelectronic technologies at the Integrated Circuit Fabrication Facility. He is an award-winning author and a trusted technical expert in microelectronics and device physics. Through his efforts, SSC San Diego is consistently recognized as a trusted supplier of advanced microelectronic technologies that are often unavailable anywhere else.

Jackie Olson, Command Visits Officer, provides outstanding detailed planning for agendas of senior Department of Defense officials. As an integral member of the Center's FORCEnet team, she coordinates all Composeable FORCEnet demonstrations and manages logistics for the FORCEnet Road Show, even scheduling the individual calendars of briefers. Her efforts have a very positive impact at a very high level on the future of the Center.

Candice Saka is an electronics engineer assigned as SSC San Diego regional shore installation manager for the Mid-Pacific Region. Her leadership and technical expertise and her ability to integrate multiple

tasks to support fleet readiness operational requirements; prepare task cost estimates, spend plans, plans of action, and milestones; and ensure installation completion to meet mission-critical dates have been documented by the numerous awards and honors.

Tom Schmitt, senior software engineer and team leader, is responsible for the design, development, integration, and test and evaluation of the highly complex Mission Control and Processing Subsystem (M-CAPS) portion of the Ocean Survey System installed aboard HMS Scott. This task included the design, development, installation, and testing of the updated M-CAPS in the System Integration Laboratory.

Barry Siegel is a nationally recognized leader in naval and joint fires and also a leader in development of systems using network-centric, publish-and-subscribe technology. Siegel was also the experimental director for the Joint Raptor 04-2 cross-service experiment that investigated joint situational awareness in a call-for-fire scenario.

James D. Smith is the Supply and Contracts Automation Support branch head. He planned, coordinated, and implemented most of the automation efforts required for supporting departmental operations. Committed to bringing "paperless" business processes to the Center, he established internal and external lines of communication to identify solutions for the numerous business problems facing the Center.

David Williamson provided special interactions and support to ensure the availability of the Global Positioning System utility for the U.S. Navy, sister services, and allied warfighters' command of the battlefield.

NAVAIR Team of the Quarter

The Marine Air Traffic Control and Landing System (MATCALS), Air Command and Control Branch was designated the "Team of the Quarter" for the second quarter of FY04. This award is the second for the MATCALS team, which also captured the SPAWAR Lightning Bolt Award in April 2004. The MATCALS team tested, packaged, and shipped more than \$700,000 in parts to detachments in the Iraqi Freedom arena and in Uzbekistan. MATCALS Team Members: Chester Adams, Paul Awes, Richard Cassity, Charles Foster, Dave Marguccio, Robert Moskol, James Roze, Roger Shweid, Robert Smith, Ray Tejidor, Ernest Williams, Ying Wong, Dave Hebert, Richard Gunn, Pete Montalvo, Steve Wadase, Angie Cisneros, Reg Rheume, Leilani Doliente, Greg Trout, John Berlin, James E. Smith, Althea Kaneaster, and Robert Zaccaria.

Support to CENTCOM Operations Center

Installations and Logistics (SPAWAR 04) presented SSC San Diego Commanding Officer Tim Flynn an award plaque for his early-on support of the critical U.S. Naval Forces Central Command Operations Control Center project located at Naval Support Activity, Bahrain. This headquarters for Navy Central Command, Fifth Fleet, and Naval Computer and Telecommunications Station, Bahrain, is a 128,141 square-foot building, which opened in January 2004.

SPAWAR Lightning Bolt Award to MATCALS

The Marine Air Traffic Control and Landing Systems (MATCALS) team was presented the SPAWAR Lightning Bolt Award for outstanding achievement in support of Operations Enduring Freedom and Iraqi Freedom. The MATCALS team provided engineering, technical, and logistics support during an unprecedented deployment of five Marine Air Command Squadron detachments responsible for coalition air traffic operations in Kuwait and Iraq. Award documentation noted that the timely and efficient execution of supplemental war funding by the MATCALS team enhanced the reputation and credibility of SSC San Diego, the Naval Air Systems Command sponsor, Office of the Chief of Naval Operation

resource sponsor, and the Headquarters Marine Corps requirements sponsor. The award letter stated that the Center has emerged as the "go-to" field activity which could result in additional supplemental funding for both FY 2004 and FY 2005. MATCALS Team Members: (1) Air Command and Control Branch: Chester Adams, Paul Awes, Richard Cassity, Charles Foster, Dave Marguccio, Robert Moskol, James Roze, Roger Shweid, Robert Smith, Ray Tejidor, Ernest Williams, Ying Wong, Dave Hebert, CWO4 Steve Wadase, Master Sgt. Rick Gunn, Gunnery Sgt. Pete Montalvo, Angie Cisneros; (2) Precision Approach and Landing System/Navigational Aid System and Mobile Surveillance Branch: Greg Trout; (3) Airspace Systems Division, Resource Manager: Reg Rheume; (4) Supply and Contracts Support Team: John Berlin, James E. Smith, Althea Kaneaster, and Robert Zaccaria.

SPAWAR On-the-Spot Awards

James Rickard was presented the SPAWAR Program Executive Officer, Command Control Communications Computers and Intelligence and Space On-the-Spot Award. Rickard was cited for outstanding contributions as the assistant program manager for the Navy's Electronic Key Management System (EKMS) Tier 1, 2, and 3 programs. He coordinated the Navy requirements for developing two new electronic key fill devices that replaced outdated and technically inferior fill devices.

Tim Newton, Product Quality Engineering, was presented with an On-the-Spot Award by Lt. Cmdr. Dave Gedra, Program Executive Office, Command, Control, Communications, Computers, Intelligence and Space, for going "above and beyond expectations" during the planning and execution of Global Command and Control System-Maritime 4.X Developmental Test V. The results of Newton's efforts enabled correction of several critical system flaws that would have otherwise gone undiscovered, significantly improving the system readiness for operational evaluation.

EXTERNAL/INDUSTRY RECOGNITION

NDIA Bronze Medal

Joe Rice was awarded the National Defense Industrial Association Bronze Medal at the 2004 Undersea Warfare Technology Conference, at U.S. Naval Submarine Base, New London, Connecticut. The award citation reads, "Mr. Rice's expertise in the area of underwater digital communications has contributed significantly to the development of undersea sensor networks, allowing wide area acoustic sensing. Leading a team of government research laboratories, private industry, and university laboratories, he has developed a fully network-capable underwater digital communications capability, known as Seaweb, which is providing the technology kernel for many underwater distributed sensor systems." Rice is a member of the Advanced Acoustic Research Branch.

NDIA Fleet Support Award

Tom Castle, Integration, Test and Evaluation, was presented the National Defense Industrial Association (NDIA) Fleet Support Award for Technical Achievement – Civilian for 2004. Castle received the award at the NDIA awards banquet on 22 October and was presented a check for \$2,500. Castle was recognized for his 14 years of involvement with fleet interoperability testing and evaluation and fleet support of combat direction systems software and tactical digital information links.

Fellow of the Acoustical Society of America Honoree

Dr. Jim Finneran, Marine Mammal Scientific and Veterinary Support Branch, was made a Fellow of the Acoustical Society of America. Dr. Finneran has provided fundamental research to answer questions regarding the potential influence of anthropogenic sound on marine mammals. This work is very important not only for animal bioacoustics but also for the acoustical oceanography community and for the Navy. Dr. Finneran has worked with Dr. Sam Ridgway on the central nervous system mechanisms of

dolphin echolocation, sound production, vision, and sleep. Dr. Ridgway wrote in his recommendation letter: "He has taken on a major scientific responsibility to fill data gaps with respect to the effects of sound on marine mammals and to replace conjecture with solid research results. I believe Dr. Finneran is serving the entire acoustics community with his outstanding work and thus is an outstanding candidate to become a Fellow of the Acoustical Society of America."

San Diego County Engineering Council's Engineer of the Year

Clark Hendrickson, branch head of the Signal Processing and Communications Technology Branch (Code 2855), was selected by the San Diego County Engineering Council as National Engineers Week "Engineer of the Year." The Engineer of the Year award recognizes a practicing engineer who has made outstanding contributions to the field of engineering. Hendrickson has been heavily involved in supporting communications interoperability for radio communications systems of the nation's first responders and public safety organizations. With the successful implementation and demonstration of the Denver Interoperability System, Hendrickson led additional implementations of interoperability systems in 2002 and 2003 in six regions throughout the Colorado. Hendrickson is currently overseeing communications interoperability efforts in Florida, Missouri, Idaho, New York, and Colorado.

Cuyamaca College Excellence in Teaching

Rick Wilson, Occupational Safety Support Group, Code 20383, received the Cuyamaca College Academic Senate's 2004 Award for Excellence in Teaching. Wilson is an adjunct instructor in the environmental health and safety technology program. A part-time instructor at the college since Fall 2000, Wilson was lauded for his many contributions as program coordinator and chair of the Environmental Health and Safety Technology Program. His contributions include curriculum writing, budget management, grants, faculty hiring, and supervising hourly staff.

Children's Science Book Award

Michelle Reddy, who has served the Navy's Marine Mammal Program as a contractor in the Biosciences Division for almost 16 years, was honored as having co-authored one of the best science books for children in a 2001 list put out by *Science Books and Films (SB&F)*, which is published by the American Association for the Advancement of Science. *SB&F* describes its evaluation as "the only critical review journal devoted exclusively to print and nonprint materials in all of the sciences and for all age groups." Reddy's book, *Bears*, was published in 2000 by Sterling Publishing Company, Incorporated, in New York. This was Reddy's second book; she is also co-author of a children's book, *Dolphin Babies*, published in 1998.

CENTER CIVILIAN AWARDS

Lauritsen-Bennett Awards

Sandra Wetzel-Smith, for Excellence In Science

As program manager of the Interactive Multi-sensor Analysis Training (IMAT) program, Sandra Wetzel-Smith was responsible for the genesis of the IMAT concept. The IMAT program revolutionized antisubmarine warfare (ASW) training by replacing conventional memorization drills with advanced scientific visualization techniques. She developed a breakthrough system that provides physics-based models and simulations of the ocean environment and provides critical training in multi-sensor analysis. ASW operators and commanders learn how to coordinate operations while experiencing a variety of threats.

John Ehlers, for Excellence in Engineering

John Ehlers' efforts over the past 38 years were instrumental in developing low-cost, highly reliable fiber-optic technology for undersea surveillance. His technical expertise, leadership skills, and ability to balance cost-versus-risk have been critical to the success of the Advanced Deployable Surveillance (ADS) program. His at-sea experiences have given him more underway time aboard submarines than most other civilian engineers. He is heavily involved with integration of ADS aboard the littoral combat ship. The impact he has made extends well beyond the ADS program and can be seen today in the Navy's capstone vision for Sea Power 21 and Network-Centric Warfare. Ehlers has been called "the father of deployable undersea surveillance."

Executive Director Award

Alan Lewis, head of the Marine Mammal Systems Technical Support Branch. Lewis is the inaugural chair of the Project Managers Council (PMC). Under his leadership the PMC built a cross-departmental network of representative project managers, from every technical division, that is capable of reaching hundreds of other project managers Center-wide. This network was used to quickly assess suitability of the Naval Air Systems Command (NAVAIR) work breakdown structure templates for SSC San Diego projects during the Enterprise Resource Planning (ERP) convergence workshops in 2003. Knowledge gleaned from exposure to other ERP implementations by NAVAIR, Naval Sea Systems Command, and Naval Supply Systems Command was used to evaluate additional SAP functionality to aid Center project management.

Secretarial Awards

Michele Ebbert, Joint and National Systems Division assistant, Tess Gallardo, Advanced Systems and Applied Sciences Division Secretary, and Gloria Galvan, Fleet Engineering Department senior assistant, for sustained high performance and outstanding secretarial contributions to the mission of the Center

Team Awards

Outlay Carryover Integrated Process Team (IPT)

This IPT team was chartered to develop an understanding of a new and complex methodology for calculating and tracking Center carryover, and then sharing that knowledge across SSC San Diego and with sponsors. Team members: David Garcia, Chad Palermo, Mary Saavedra, Kathy Davis, Marty Machniak, Tom Tumosa, Barry Randall, Billie Coon, Pat Sullivan, Sara McMurrey, Bettye Boley, Diana Griffin, Lisa Calvin, Loydel Epstein, Mary Cooper, Linda Modica, Glenn Yee, Sharon Miller, and Margaret Robbie.

BLII OCONUS FY 2004 Enhancements Implementation Team

Program Executive Office, Command, Control, Communications, Computers Intelligence, and Space (PMW-165) tasked the Strategic Network Systems Branch to manage the BLII OCONUS FY 2004 server farm enhancements upgrades for improved Secret Internet Protocol (IP) Router Network and N-Level (Unclassified But Sensitive) IP Router Network services to customers. Team members: Rafael Maldonado, Israel Arenas, Mytiec Lam, Hang Le, Maurice Murphy, Michele Kendall, Fari Rostami, Omer Nasori, Jin Park, Bill Helmick, Orlando Lugo, Rich Harvey, Robert Robledo, Roy Makio, Frank Salas, Robin Hecita, Greg Salcedo, Jeffrey Chang, Michael Morrow, Alcide Davis, Jeffery Miller, Michael Frasher, Raymond Matsuno, Collin Wong, Kalani Kitamura, Art Kluvo, Jose Valladares, Sarah Guillergan Perez, Judy Flores, and Rick San Nicolas.

Theater Anti-Submarine Warfare (TASW) Composeable FORCEnet Team

Composeable FORCEnet (CFn) is a services-oriented application of FORCEnet prototype technologies. In November 2003, Chief of Naval Operations (CNO) Adm. Vern Clark requested that the CFn team deliver an operational version of the CFn antisubmarine warfare (ASW) demonstration to the fleet as soon as possible to improve theater ASW command and control. In response to the CNO's request, the Center organized the TASW Composeable FORCEnet team. Team members: Marco Muniz, Doug Hardy, Thomas Aird, Sharon Shivers, Terri Hupp, Bruce McCoy, Christopher Priebe, Steve Sharp, Andrew Marks, Sam Abuzalaf, Peggy West, Robert O'Leary, Mark Schwartz, Robin Chu, John Kottong, Sandy Wetzel-Smith, Bobby Ramirez, Eleanor Holmes, Jay McInvale, Carmela Keeney, Patricia Thomas, Tom Cassidy, Daniel New, Arthur Valdivia, Genia Kyres, Orlando Lugo, Chuck Schwartz, Imelda Martinez, Paul Iordanides, Amy Hadley, Dr. Wally Wulfeck, Richard McGiff, Zackeriah Marble, Jeff Clarkson, Wyatt Bertel, Peter Wussow, James Boerke, Aaron Judd, Matthew Scallon, Carl Suttle, Namejs Reinbachs, Jimmy Linh, Tony Truong, Mike Reiley, Jack Gerrard, Jim Chiou, Joseph Schmeltzer, Samantha Fields, Matt Smith, Brian Richardson, Dan Lawrence, James Price, Charles Moussa, Lt. Cmdr. Pat Mack, Rick Loanzon, Jack Heckerman, Phil Summerly, Jorge Pena, James Hall, Todd Almond, Brent Gillespie, Julie Interchuck, David Schmiedeberg, Ted Rogers, Wayne Patterson, Kent Allen, and Gary Lindem.

White Shipping Workshop Planning Team

The White Shipping and Maritime Interdiction Workshop organizing team was presented a cross-SSC San Diego Achievement Recognition award. The workshop was co-sponsored by the National Reconnaissance Office, the U.S. Coast Guard, and the Office of Naval Research. It is considered one of the key command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) centers for ship tracking technologies in support of maritime interdiction. The workshop brought together key players from the joint, national, warfighter, and maritime intelligence community to address technical solutions to the threat posed by commercial maritime shipping, or "White Shipping." Key organizers from the Intelligence, Surveillance, and Reconnaissance Department included: Abby Westerman, Pat Sullivan, Joan Kaina, Henry Gok, and Anastasia Dimitriu. Other key program committee contributors included: Dr. Clarence Funk, Dr. Joseph Fitchek, Mark Econie, Dr. Gerry Baumgartner of the Communication and Information Systems Department, Dr. Bill Torrez, Dr. Marion Ceruti of the Command and Control Department, Gary Dorrance, Scott Adams, John Gerber, and Frank White from the Office of Business Development and Technology.

Fiber-Optic Micro Cable Precision Winding Team

The Intelligence, Surveillance, and Reconnaissance Department Group Achievement Recognition award was presented to the Fiber-Optic Micro Cable (FOMC) Precision Winding Team. The FOMC winding facility provided support to several classified programs by preparing, packaging, quality control testing, and shipping FOMC coils for use by the Navy. Currently the FOMC team is the Navy's only source for small-cable precision winding. The FOMC team members are: Kristin Smith, Mike Kuntzman, Ron Tong, Joe Aboumrad, Joe Morales, Tim Williams, Sue Briest, Lynn Collins, and Alison Whelehan.

Exemplary Achievement Awards

For sustained performance and specific achievements that merit Center recognition. The recipients of this award were: Susie Alderson, Israel Arenas, Robert Ashley, Viktor Bana, Stephen Bolger, Heidi Boose, Nancy Campbell, Richard Carswell, Keith Church, Gary Coburn, Don Coker, Mary Cooper, Natalie Cullimore, Samuel Cunningham, Dr. Stephen Doss-Hammel, Vince Duenas, Irvine Eanes, Patrick Earley, Tracey Flournoy, Steve Frisbie, John Gerber, Ernest Gibson, John Girdwood, Shelton Green,

Linda Greenwade, Delmar Haddock, Jovanna Henry, Will Henry, Norm Heuss, Walter Horikawa, Chun Hui, C.W. Harry Hui, Dr. Eric Jensen, Trinh Khong, Christopher Kneib, Steve Koepenick, Brian Koerble, Robert Krafton, John Laiche, BeEm Le, Justin Lee, Inez Lontayo, Analiza Lozano, Treston Masada, Yvette McCamant, Keyko McDonald, Jennifer McKamey, Linda L. Miller, Patricia Miranda, Frank Moody, Donald Moore, Gary Murphy, Kay Myers, Kathleen Nelson, Anh Ngoc Nguyen, Nhan Nguyen, Su Huu Nguyen, Sally Parker, Peggy Petersen, John Peterson, Jeremy Popp, Jeffrey Quy, Ted Reed, Reg Rheume, Mark Richardson, James Rickard, Pete Rieth, Fari Rostami, Gail Rutherford, Michael Ryan, Matt Scallon, Bill Schemensky, Jeffrey Schnitzer, Sharon Shivers, David Smith, Dewey Sorenson, David Southworth, Marc Stonebraker, Wilma Swayne, Kathryn Trainor, Tom Tumosa, Roy Villa, Dianne Walker, Dr. Earl Williams, Greg Whalin, Brian Whyte, Kris Witbrodt, Kim Wollin, and Ken Yamada.

CENTER CAREER SERVICE AWARDS

45 Years

Dr. George Benthien and William Watts.

40 Years

Gerald Bradshaw, Joaquin Cruz, John Flynn, John Granlee, Roger Ligon, J.C. Norris, Jim Pomerene, John Wadsworth, Abundio Alvarez, Robert Calland, Arthur Chagnon, Dr. Donald Christy, Dr. I.R. Goodman, Carl Kugel, Richard Morin, Paul Steele, Malcolm Sylvester, and Kenneth Yamauchi.

35 Years

Carrie Alexander, Carol Batchelor, Barbara Busch, Ernest Candelaria, Rick Casalme, Welliery Cefre, Sam Corrao, Linda Delgado, Rhea Feldman, Paul Gelle, Mark Hartsough, Jim Hlava, Jack Kaye, George Kosmos, Tom LaPuzza, Richard Schindler, John Sevco, Joan Sieber, Eldred Smith, John Switlik, Greg Trout, Bill Windhurst, Robert Abramo, Kenneth Avedisian, Albert Ayson, Maureen Batterm, Judith Belchamber, John Bentley, Jerry Driesenga, Loydel Epstein, Dr. Robert Fleming, Daniel Garcia, Willie Hardy, Gary Hartling, Robert Henry, Francis Hirota, Michael Hoernemann, George Hoover, Bruce Jenkinson, Tom Kachians, Steven Kennison, George Kramer, Stephen Kubicki, Phillip Lazar, Ira Lerner, David Lutz, Phillip Magpoc, Howard McCracken, Edmundo Rodriguez, Robert Rowe, Dennis Rozanski, Pamela Sanchez, Alvin Shimogaki, Bill Sullivan, Augie Troncale, Rey Tuazon, and Stan Vermeers.

30 Years

John Berlin, Peggy Boysen, Anthony Brancato, Bruce Burset, Burt Carlson, Dana Cottrell, Linda Delgado, Vivian DiCristofaro, Tom Duffy, Wayne Gerth, John Handal, Chew Hom, Judith Jolly, Terry Keener, Ken Kelson, John Laccone, Keith Leung, Paul Leupold, Gary Marx, Thomas Matsumoto, Stephen McNeil, Daniel Meeks, Stephen Moriki, Jackie Olson, Gale Pennoyer, Dr. Bob Smillie, Dave Southworth, John Thomas, Bobby Thrasher, Bruce Wahlen, Dianne Walker, Bill Wild, Bob Zebuda, Joseph Aboumrad, John Audia, Barbara Barber, Dr. Frank Borkat, Gary Cappelli, John Cassaboom, Steven Chance, Rodney Cozad, Bart Everett, Edward Faltemier, Gary Gesell, Ralph Glenn, Joyce Hameloth, Wayne Hameloth, John Harden, Stan Heins, Dr. Charles Hicks, Robert Holub, Thelma Jones, Michael Jones, Stephen Kuba, William Laird, Joseph Loughlin, J. Daniel Lumpkins, Richard Martinez, Pat McCallan, Paul McGinnis, Charles Noble, Oscar Rios, Jerome Rosenthal, Edward Rynne, Dr. Steve Sander, William Schemensky, Lyle Steger, Charles Storicks, Bruce Van Hyfte, Aleta Wallace, Dr. Cliff Warner, Joseph Weber, Dwight Wilcox, and Ed Zantek.

APPENDIX B: CY 2004 PATENT AWARDS

Inventor(s)	Title	Patent No.	Date
Rask, Willard DeJaco, Jerome	Slotted Cylinder Transducer with Trapezoidal Cross-Sectional Electrodes	6,678,213 B1	13 Jan 04
Becker, Carol A.	Visible Light pH Change for Activating Polymers and other pH Dependent Reactants	6,699,442 B1	2 Mar 04
Ramirez, Ayax D. Russell, Stephen D. Brock, David W.	Synergistic Method for Assessing an Electromagnetic Radiating Tube System	6,697,014 B1	24 Feb 04
Garcia, Graham A. Imthurn, George P.	Triple Base Bipolar Phototransistor	6,703,647 B1	9 Mar 04
Kamin, Nackieb M. Russell, Stephen D. Clayton, Stanley R. Kasa, Shannon D.	Method for Improving Reliability in Trench Structures	6,709,976 B1	23 Mar 04
Cronyn, Willard M.	Calibrator for Radar Target Simulator	6,710,737 B1	23 Mar 04
Scheps, Richard	Automobile Engine Disabling Device	6,723,225 B2	20 Apr 04
Ramirez, Ayax D. Russell, Stephen D. Shimabukuro, Randy L.	Resonance Tunable Optical Filter	6,738,194 B1	18 May 04
Coleman, Jeffrey L.	Universal Digital Camera Controller with Automatic Iris Tuning	6,727,941 B1	27 Apr 04
Russell, Stephen D.	Spatially Conformable Tunable Filter	6,753,994 B1	22 Jun 04
Cartagena, Eric N.	Complementary Vertical Bipolar Junction Transistors Fabricated of Silicon-on-Sapphire Utilizing Wide Base PNP Transistors	6,759,303 B1	5 Jul 04
McGirr, Scott C.	Method of Using Ocean Acoustic Sensors for Coastal Earthquake Prediction	6,763,306 B2	13 Jul 04
Waters, Richard L. Aklufi, Monti E.	Micro-Electro-Mechanical Systems Ultra-Sensitive Accelerometer with Independent Sensitivity Adjustment	6,763,718 B1	20 Jul 04
Wisenfarth, Hans J.	Tapered, Folded Monopole Antenna	6,774,858 B1	10 Aug 04
Scheps, Richard	Laser Having a Temperature Controlled Solid-State Dye Gain Element	6,775,313 B1	10 Aug 04
Boss, Pamela A. Lieberman, Stephen H.	Integrated Optical Waveguide Sensor	6,776,962 B1	17 Aug 04
Stevenson, J. Mark Briest, Susan G. Olson, Jack R. Fronk, Alan McDonald, Vincent K.	Automatic Gain Control	6,782,063	24 Aug 04

Fletcher, Christopher L.
Marn, William H.

Meloling, John Harold
Hurdsmann, David Earl
Massey, Wendy Marie

Dual Chambered Anechoic Chamber

6,784,670 B1 31 Aug 04

Adams, Richard C.
Von Mueller, Daryl

Ultra-Broadband Antenna Incorporated into a
Garment with Radiation Absorber Material to
Mitigate Radiation Hazard

6,788,262 B1 7 Sep 04

Scheps, Richard

All Solid-State RGB and White Light
Generator

6,795,455 B2 21 Sep 04

APPENDIX C: CY 2004 DISTINGUISHED VISITORS

January

13	RADM Thomas E. Zelibor, USN Director, Space, Information Warfare, Command and Control Division (N61/N7) Office of the Chief of Naval Operation
13	RDML William Kowba, USN Commander, Fleet and Industrial Supply Center
14	Ms. Catherine Montie Chief, Nuclear Stockpile and Combat Support Division Defense Threat Reduction Agency Ms. Alane Andreozzi Deputy Chief, Emergency Management Division
21–22	Mr. Charles Strimpler Deputy Director, Space & Terrestrial Communications Directorate U.S. Army Communications-Electronics Research Development and Engineering Center (CERDEC)
27	ADM William J. Fallon, USN Commander, Fleet Forces Command
28	MAJ GEN Tommy Crawford, USAF Commander, Air Force Command and Control, and Intelligence, Surveillance and Reconnaissance Center
29	Young Presidents Organization San Francisco Chapter

February

- 2 RADM Mark Fitzgerald, USN
Director, Air Warfare Staff (N78)
Office of the Chief of Naval Operations
- 5 Mr. Michael Velasquez
Legislative Director & Military Legislative Assistant for Representative Susan
Davis (D-CA)
- 11 Dr. Kirk Evans
Program Manager, Maritime and Border Programs
Homeland Security Advanced Research Projects Agency (HSARPA)
- 12 Mr. Jeffrey High
Director, Maritime Domain Awareness
U.S. Coast Guard Headquarters
- 18 Strategic Studies Group XXIII
Globalized FORCEnet & Decision-Making Concept Generation Team
U.S. Naval War College
- 20 VADM Christopher Ritchie, AO, RAN
Chief of Navy
Royal Australian Navy
- 23 Mr. Roger Carpenter
Chief, Information Operations Division
U.S. European Command

March

- 1-3 RDML Rose Levitre, USN
Director, FORCEnet ISR
Office of the Chief of Naval Operations

- 2 Mr. Don McCormack
Product Area Director (PAD) for USW Command and Control
Naval Undersea Warfare Center Newport Division
- 10 RDML James Winnefeld, Jr., USN
Director, Warfare Programs and Readiness (N8)
Commander, Fleet Forces Command
- 16–18 Ms. Vivian Cocca
Co-Lead, Goal 4: Transforming & Enabling IA for Innovation
Networks and Information Integration
Office of the Secretary of Defense
- 24–25 COMMODORE James Stapleton, RAN
Naval Attache/Assistant Defence Attache
Australian Embassy
- 31 Senior Command, Control, Communications & Computers (C4) Board
AUSCANNZUKUS

April

- 21 Mr. Randy Cieslak
Chief Information Officer (CIO)
U.S. Pacific Command

May

- 17 U.S./UK Young Scientists Laboratory Visit Program Participants
- 20 RADM Mark Edwards, USN
Director, Surface Warfare Division (N76)
Office of the Chief of Naval Operations
- RADM(s) Anthony Winns, USN
Deputy Director, Air Warfare Division (N78B)

June

- 2 MG John Holly, USA
Program Director, Ground-based Midcourse Defense (GMD)
Joint Program Office
Missile Defense Agency
- 2-3 Mr. John Lauder
Deputy Director for National Support
National Systems
National Reconnaissance Office (NRO)
- 4 Mr. Pete Dayton
Technical Authority to the Director and Chief, Command Architectures
Division, Architectures and Integration Directorate
North American Aerospace Defense (NORAD) – U.S. Northern Command
- 9 RADM Steve Tomaszewski, USN
Director, Space, Information Warfare, Command and Control Division
(N61/N7)
Office of the Chief of Naval Operations
- 14 Rear Admiral Ronnie Tay
Chief of Navy
Republic of Singapore Navy
- Brigadier General Tse-Chow Voon
Defense and Naval Attaché to the United States
Republic of Singapore Air Force
- CAPT Rivers Cleveland, USN
Defense and Naval Attaché to Singapore

15 Mr. Kenneth Miller
Assistant Deputy CNO Warfare Requirements and Programs (N6/N7B)
Office of the Chief of Naval Operations

15 Mr. Eric Blatt
Head, Command, Control, Communications, Computers, Intelligence,
Surveillance & Reconnaissance Department
Defense Intelligence Agency (DIA)

July

7 RDML(s) William Landay, USN
Program Executive Officer
Littoral and Mine Warfare

12 RDML Elizabeth Hight, USN
Director, Fleet and Allied Requirements Division (N60)
Office of the Chief of Naval Operations

30 Dr. Charles Holland
Director, Science and Technology Information Systems
Deputy Under Secretary of Defense (Science and Technology)
Office of the Deputy Under Secretary of Defense

30 RADM(s) Robert D. Reilly, Jr., USN
Deputy for C4 Integration and Policy / DoN Deputy CIO
Office of the Chief of Naval Operations

August

2 Commodore Mark Anderson BSc, RN
Director, Equipment Capability, Underwater Effects
Ministry of Defense
United Kingdom

4	Dr. Allen Moshfegh Program Manager, Information Exploitation Office (IXO) Defense Advanced Research Projects Agency
5	Mr. Greg Maxwell Deputy, Human Systems Integration Directorate Naval Sea Systems Command
6	Ms. Linda Newton Deputy Chief of Staff for C4I / Command Information Officer Commander, U.S. Pacific Fleet
11	BG Richard Geraci, USA Director, National Security Space Architecture (NSSA) / Prospective Deputy Director for Military Operations National Security Space Office (NSSO)
16	Congressional Staff Delegation (18)
23-24	RDML Richard B. Porterfield, USN Director of Naval Intelligence, N2 Office of the Chief of Naval Operations
24	MAJ Gen Dale W. Meyerrose, USAF Director, Command and Control Systems Headquarters, North American Aerospace Defense Command/ Director, Architectures and Integration Headquarters, U.S. Northern Command
31-1 (Sep)	Ms. Mieke Eoyang Military Legislative Assistant to Senator Edward Kennedy (D-MA) The United States Senate

September

- 1 Dr. Freider Seible
Dean, Jacobs School of Engineering
University of California, San Diego
- 1-2 Ms. Deborah Danish
Government Electronics & Information Technology Association (GEIA)
- 13 Mr. Wolfgang Stolp
President, Federal Office of the Bundeswehr (Armed Forces) for Information
Management and Information Technology
Bundeswehr International Tactical Links Office
- 14 Dr. Robert Zarnich
Chief Scientist / Advanced Signal Processing Lead
Program Executive Office – Integrated Warfare Systems 5
- 27 RDML Stephen Johnson, USN
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- 30 RADM Mark Edwards, USN
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- 30 Mr. Stephen Gates
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October

- 6-7 RDML Andrew M. Singer, USN
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- 12 Dr. David Hayhurst
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- 27 BRIG GEN Robert Dehnert, Jr., USAF
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State Secretary
Ministry of Defense, Sweden
- 1 VADM Alberto Castro Rosas
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- 1 RADM Jose Betancourt
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4	Mr. Don Schregardus Deputy Assistant Secretary of the Navy for Environment Office of the Secretary of the Navy
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9	Mr. Steve Duncan Director, Institute for Homeland Security Studies National Defense University
16	VADM Walter Davis, USN, RET San Diego Telecommunications Council
18	Mr. Carl Siel Deputy Chief Engineer Office of the Assistant Secretary of the Navy (RD&A)
30–1 (Dec)	Ms. Kristi Mallard Professional Staff Member, Defense Appropriations Subcommittee United States House of Representatives
7	Mr. Norman Polmar Chair, S&T for Naval Warfare, 2015–2020 Naval Research Advisory Committee

APPENDIX D: CY 2004 MAJOR CONFERENCES AND MEETINGS

January

- 21-22 Systems Commands' Anti-Terrorism Force Protection Leadership Team (SALT)
- 22 Space Technology Alliance Meeting

February

- 3-5 Emergency Action Message Implementation Team Program Management Review
- 10-12 Department of Defense (DoD) High Performance Computing (HPC) Modernization Program Service/Agency Approval Authority (S/AAA) Meeting
- 9-13 Interoperable Networks for Secure Communications (INSC) Steering Committee Meeting
- 18-19 Defense Advanced Research Projects Agency (DARPA) Dynamic Tactical Targeting (DTT) Transition Meeting 1

March

- 3 Navy Modeling & Simulation Management Office (NAVMSMO) Verification, Validation & Accreditation Technical Working Group Meeting
- 8-12 The Technical Cooperation Program (TTCP) Meeting
- 9-12 Horizontal Fusion Meeting
- 16-17 Joint Tactical Radio System/Wideband Networking Waveform (JTRS/WNW) Technical Interchange Working Group Meeting
- 17-18 Naval Research Advisory Committee (NRAC) Venture Capital Panel Meeting
- 23-30 The Technical Cooperation Program Maritime Technical Panel 10/Sensors Action Group 7 Joint Meeting (TTCP TP10/AG7)
- 30 Small Business Innovation Research (SBIR) Anti-Terrorism Meeting

April

- 7-8 FORCEnet Human Systems Integration Working Group
- 8 Mathworks Seminar
- 13-14 Aegis Ballistic Missile Defense (BMD) Interim Program Review (IPR)
- 22 National Defense Transportation Association (NDTA) Meeting
- 28 AFCEA/SSC San Diego 2004 C⁴ISR Symposium
- 27-28 Shore Install Process Meeting

May

- 19–20 Silent Hammer Main Planning Conference (SH MPC)
- 24–28 Joint Cross Domain Exchange Ocean Surveillance Information Systems Requirements Working Group 12
- 25–26 FY 04 Undersea Dominance Program Review Conference

June

- 2–4 White Ship Tracking & Maritime Interdiction Workshop
- 16–18 CVN 70 Quarterly Program Review
- 16–17 Naval Studies Board Spring Meeting
- 22–23 Internet Relay Chat (IRC) User's Conference
- 29–1 (July) Commander Operational Test & Evaluation Force (COMOPTEVFOR) Quarterly Test & Evaluation Meeting

July

- 12 Defense Science Research Council (DSRC) Asymmetrical Future Threat Meeting
- 14–15 Tactical SIGINT Technology (TST) Technology Review Panel (TRP) Meeting
- 14–15 Joint Rapid Architecture Experimentation (JRAE) Final Planning Meeting
- 27–28 Joint Services Cryocooler Conference
- 27–28 Silent Hammer Final Planning Conference

August

- 3–4 CVN 21 Decision Space Working Group Meeting
- 4–6 Cryptographic Material Life Cycle Support Panel (LCSP) Meeting
- 17 Cyber Threat to United States Information Infrastructures
- 23–25 Joint Unmanned Combat Aerial Symposium (J-UCAS)
- 31–2 (Sep) Critical Measurements Counter-Measures 2 (CMCM2) Planning Meeting

September

- 7–10 21st United States/United Kingdom Submarine Communications Symposium
- 9 Naval Transformational Communications (TC) Meeting
- 14–16 & 21–23 Submarine Operating Authority Integrated Process Team (IPT) Meeting
- 21–23 Defense Advanced Research Projects Agency (DARPA) Perceptive Assistant that Learns (PAL)
- 28 Information System Test Technology Meeting

- 28 Marine Aviation Weapons and Tactics Squadron (MAWTS) One
- 28 Silent Hammer Pre-Sail Conference

October

- 6-7 FORCEnet One Star Deep Dive
- 18-20 41st International Association of Old Crows Symposium
- 19-21 Cryptographic Modernization Interoperability Testing Integrated Product Team Working Subgroup on Documentation Development
- 20-26 Air Standardization Coordinating Committee (ASCC) Convening Order 11th Meeting of Working Party 80

November

- 8-12 Joint Cross Domain Exchange/Ocean Surveillance Information Systems Evolutionary Development Requirements Working Group 13 (JCDX/OED/ORWG-13)
- 18-19 Nuclear Command, Control & Communications Hybrid Solutions Sustainment & Long Term Solution Action Officer Meeting

December

- 6-7 Maritime Domain Awareness (MDA) Technology Meeting
- 7-8 Anti-Terrorism Small Business Innovation Research Technical Interchange Meeting (TIM)
- 7-8 Distributed Cryptologic Operations Broad Area Announcement (BAA) Meeting
- 8 Advanced Container Security Device Kick-Off Meeting
- 13-17 Army Tactical Exploitation of National Capabilities (TENCAP) Users Working Group (ATUWG) Conference

APPENDIX E: ACRONYMS

BMD	Ballistic Missile Defense
BMDS	Ballistic Missile Defense System
BRAC	Base Closure and Realignment
C ²	Command and Control
C ³	Command, Control, and Communications
C ⁴	Command, Control, Communications, and Computers
C ⁴ I	Command, Control, Communications, Computers, and Intelligence
C ⁴ ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CFn	Composeable FORCEnet
CFn-HSI	CFN Human–Systems Integration (Laboratory)
CPF	Consolidated Production Facility
CY	Calendar Year
DARPA	Defense Advanced Research Projects Agency
DoD	Department of Defense
EDSRA	Extended Drydocking Selected Restricted Availability
EGI	Embedded GPS Inertial (Navigation Unit)
ENWGS	Enhanced Naval Wargaming Simulation
ERP	Enterprise Resource Planning
FIRST	For Inspiration and Recognition of Science and Technology (Robotics Competition)
FM	Flight Mission
FOMC	Fiber-Optic Micro Cable
FY	Fiscal Year
GCCS–M	Global Command and Control System–Maritime
GENSER	General Service
GIS	Geographic Information System

GPS	Global Positioning System
HPC	High Performance Computing
HPCMP	High Performance Computing Modernization Program
HQ	Headquarters
HYDRA	Hierarchy Yet Dynamic Radio Assembly
IFR	Instrument Flight Rules
IO	Information Operations
IOCOF	Information Operations Center of the Future
IPT	Integrated Product and Service Team
IRC	Internet Relay Chat
ISR	Intelligence, Surveillance, and Reconnaissance
IT	Information Technology
IWCAT	Information Warfare Combat Assessment Tool
JDAM	Joint Direct Attack Munitions
JIATF	Joint Interagency Task Force
JPSC2	Joint Perimeter Surveillance Command and Control
JTeL	JTRS Technology Laboratory
JTRS	Joint Tactical Radio System
JWATS	Joint Wide-Area Tracking System
JWID	Joint Warrior Interoperability Demonstration
MATCALS	Marine Air Traffic Control and Landing Systems
MDA	Missile Defense Agency
MDSS	Medical Data Surveillance System
MESA	Mathematics, Engineering, and Science Achievement (math and science enrichment program)
NAVAIR	Naval Air Systems Command
NCIP	Navy Career Intern Program
NP	New Professional
NREIP	Naval Research Enterprise Intern Program

NROWS	Network-Integrated Remotely Operated Weapon System
NSPS	National Security Personnel System
OPNAV	Office of the Chief of Naval Operations
PAT	Process Action Team
PC	Personal Computer
PCO	Project and Contracting Office
PMAC	Project Management Advisory Council
PMC	Project Management Council
SINGARS	Single-Channel Ground and Airborne Radio System
SIPRNET	Secret Internet Protocol Router Network
SOCPAC	Special Operations Command, Pacific
SPAWAR	Space and Naval Warfare Systems Command
SSC San Diego	Space and Naval Warfare Systems Center San Diego
SSP	Stable Semisubmerged Platform (<i>Kaimalino</i>)
SW-CMM	Software Engineering Institute's Capability Maturity Model for Software
TRC	TeleRobotics Corporation
UHF	Ultrahigh Frequency
USER	Usability and Engineering Research (Laboratory)
USJFCOM	U.S. Joint Forces Command
USPACOM	U.S. Pacific Command
VHF	Very High Frequency
VPACS	VHF Portable Amplified Communications Set
WARNET	Wide-Area Relay Network
WEBSKED	Web-Based Scheduling (ship employment scheduling application)

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